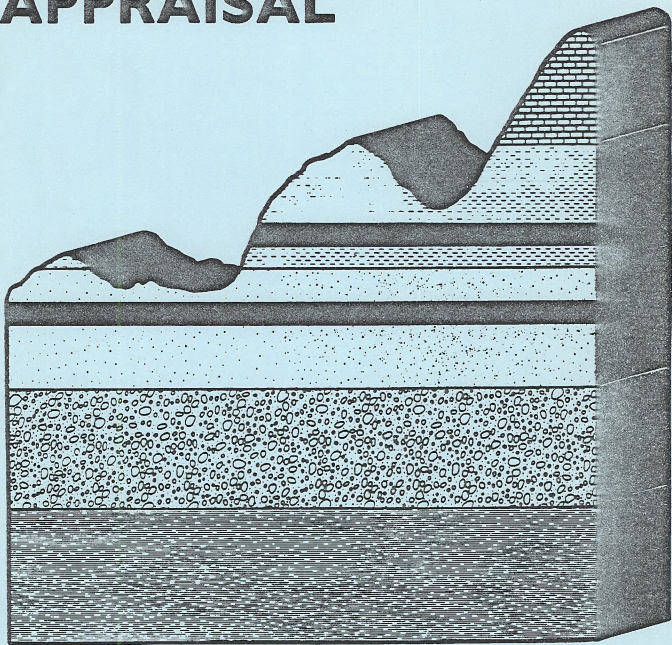


# A GUIDE TO FEDERAL COAL PROPERTY APPRAISAL



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U. S. DEPARTMENT OF THE INTERIOR  
Bureau of Land Management  
February 1985



# 11892477

FD: 88015642

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A GUIDE  
TO  
FEDERAL COAL PROPERTY APPRAISAL

Prepared for  
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## LIST OF ACRONYMS

AEOT	Average Evaluation of Tract
BLM	Bureau of Land Management
CREV	Coal Resource Economic Value
DCF	Discounted Cash Flow
DOI	Department of the Interior
EMARS	Energy Minerals Activity Recommendation System
EPRI	Electric Power Research Institute
FCLAA	Federal Coal Leasing Amendments Act
FLPMA	Federal Land Policy Management Act
FMV	Fair Market Value
MLA	Mineral Leasing Act
MU	Mining Unit
NPV	Net Present Value
OMB	Office of Management and Budget
RET	Regional Evaluation Team
SID	Secretarial Issue Document
USGS	United States Geological Survey



## 1. INTRODUCTION

### 1.1 PURPOSE

The purpose of this guide is to present guidelines for Federal coal property/right appraisal in terms useful to the administrator who is responsible for appraisals and to the field personnel who perform them. An appraisal is a valuation. In the context of this guide, the principal concern is the valuation of a Federal coal property/right offered for lease, exchange, conveyance, lease modification, or coal right transfer.

The value estimated for Federal coal lease sales is used to ensure receipt of at least the fair market value (FMV) as required by the Federal Coal Leasing Amendments Act of 1976 (FCLAA). The value for other transactions is used in accordance with the authorizing legislation. As such, the appraisal process embraces a range of evaluation procedures which, when applied to available data, lead to an estimation of the property's value. In application, the data from which the appraisal is drawn often is limited, leading to an estimate that inherently is uncertain; consequently, estimates of fair market value, compensation, equal value, or other value may vary among appraisers. The guidelines contained in this guide are presented to limit these differences and to promote a uniform approach to Federal coal property/right appraisal. The intent is to encourage consistent and replicable application of standard appraisal procedures.

The guide discusses two approaches to value estimation: the comparable sales approach and the income approach. The comparable sales approach uses prior transactions of similar coal properties to value the Federal coal property/right to be disposed of through leasing, exchange, or other means. The income approach estimates the property/right value by determining its income-producing potential. The comparable sales approach is preferable because it is believed that prior transactions of similar coal properties provide the best indication of value.

Therefore, the application of a specific approach depends primarily on the type of data available to the Regional Evaluation Team (RET).

The purpose of the guidelines is to assist field personnel through the appraisal process by providing a systematic approach to Federal coal property/right valuation from which a reproducible and defensible estimate of value can be developed. The informed RET is encouraged to use professional judgment to interpret the data and select from alternative appraisal procedures the method that may best be applied; however, a clear rationale to all decisions regarding the use of alternative data or appraisal procedures must be provided. In a situation where an alternative approach is used, sufficient rationale for using the approach must be provided. A statement of professional judgment in and of itself is not sufficient.

## 1.2 FAIR MARKET VALUE

An appraisal is concerned with an estimation of the fair market value of a property/right or equal value in exchange. Under the FCLAA, the Secretary of the Interior shall not accept a bid that is less than the fair market value of the coal subject to the lease. Also, specific legislation regarding coal lease and fee exchanges, as well as the Federal Land Policy Management Act of 1976 (FLPMA), requires equal value determinations. Although the term "fair market value" has no statutory definition, an accepted meaning has evolved through judicial interpretation.

The traditional definition of fair market value, as stated in Uniform Appraisal Standards for Federal Land Acquisitions,<sup>1</sup> is as follows:

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<sup>1</sup>Uniform Appraisal Standards for Federal Land Acquisitions, Interagency Land Acquisition Conference, U.S. Government Printing Office, Washington, D.C., 1973.



"Fair market value" is defined as the amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would be sold by a knowledgeable owner willing but not obligated to sell to a knowledgeable purchaser who desired but is not obligated to buy. In ascertaining that figure, consideration should be given to all matters that might be brought forward and reasonably be given substantial weight in bargaining by persons of ordinary prudence, but no consideration whatever should be given to matters not affecting market value.

The Appraisal of Real Estate<sup>2</sup> provides a second definition of market value, as follows:

[Market value is] the most probable price in cash, terms equivalent to cash, or in other precisely revealed terms, for which the appraisal property will sell in a competitive market under all conditions requisite to fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress.

The salient features of the definitions are as follows:

- Fair market value is characterized as, or is representative of, a transaction between a knowledgeable buyer and a knowledgeable seller.
- Neither buyer nor seller is obligated or under duress to buy or sell.
- Fair market value is determined by reference to a competitive market rather than to the personal or inherent value of the property.

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<sup>2</sup>The Appraisal of Real Estate, 8th ed., American Institute of Real Estate Appraisers, Chicago, Illinois, 1983.

-- The property is exposed to a competitive market for a reasonable time.

In accordance with the market concept, the price paid for a similar property in an arm's-length transaction is accepted as the best evidence of fair market value. However, in the absence of a market, judicial interpretation of the fair market standard permits the valuation of the property in a hypothetical market. Factors to be considered in estimating value include probable demand, property location, and property use.

### 1.3 HISTORY OF COAL FAIR MARKET VALUE ESTIMATION

The need for value estimations of Federal coal properties/rights evolved from the Mineral Leasing Act of 1920, which changed procedures for the acquisition of coal mineral rights from outright sales to leases. Early efforts to ensure reasonable value for coal property/rights looked to the Federal Property and Administrative Services Act of 1949, whereby coal, in lands reported as surplus, was disposed of by the General Services Administration. In 1959, the Bureau of the Budget [now the Office of Management and Budget (OMB)] stated that fair market value should be obtained where federally owned resources are leased or sold.

Prior to 1970, the Department of Interior paid little attention to setting a value for coal leases. Competitive and noncompetitive leases were available at little cost, because it was thought that the Federal Government would receive a fair return through royalty collection. In 1971, the Conservation Division of the U.S. Geological Survey (USGS) adopted the "K-Factor" formula of evaluation. This was an empirical formula that considered the total thickness of minable beds, the Btu value, the coking quality, and the depth. The formula included a variable, K, that was determined by the Area Mining Supervisor based on his judgment of market conditions and other factors. The K-Factor formula forced the Area Mining Supervisor to specifically consider important geological parameters. However, the formula was used for valuing few leases because in 1971 the Department issued an informal

coal leasing moratorium to prevent speculation. This action was followed in 1973 by a formal moratorium on leasing, except for short-term leases meeting specific criteria, while the Department developed a new long-term leasing policy. In 1975, a programmatic environmental impact statement was released on the proposed Energy Minerals Activity Recommendation System (EMARS) program. One of the goals of the new policy was the return of FMV for Federal coal lease tracts.

Development of new coal evaluation procedures by the Department began in late 1975 in response to criticism directed at existing evaluation procedures. The new method was based on the income approach utilizing discounted cash flow (DCF) procedures. The development efforts were carried out by the Conservation Division and included development of documented operational procedures and a computerized DCF program. Computer-generated DCF values were used as the Department's estimate of FMV.

Economic evaluation was structured as a three-level function: (1) resource determination by the area geologist, (2) mining method and mine design by the area mining supervisor, and (3) costing and economic evaluation (including tract valuation) by the economic evaluation staff. The tract results were assessed by a three-member committee that made a recommendation to the State Director to be used in determining FMV.

Beginning in 1977, the Department decided to provide an indication of its estimation of value when offering leases. This took several forms between 1977 and 1980, including advertising leases at minimum bonus bids with royalty rate bidding; advertising leases at minimum statutory royalty rates and variable bonus bids; and offering the bidders a choice between the two. These published values, in effect, were the Department's presale estimate of value, and any bid at or above these amounts was accepted as FMV. During this time, concern was expressed over the meaning of FMV in light of legal requirements and Federal goals and responsibilities concerning coal leasing and development. In 1979, a Federal coal leasing FMV task force was convened to develop options for FMV and minimum acceptable bid policy

and criteria. A Secretarial Issue Document (SID) was prepared, which dealt with the definition of FMV, the definition of minimum acceptable bid determination for different tract types, and other policies for Federal coal tract evaluation. The SID required that "fair market value for Federal coal leases should steer a course midway between seeking to maximize capture of economic rent and satisfying the minimum legal obligations." The SID also required that large and small tracts be evaluated differently and that FMV should be captured through the use of higher than regulatory minimum bids where appropriate, rather than elevating the royalty rates.

To implement the SID, an Oversight Group was established to set procedures for differentiating large and small tracts. Preliminary mineral appraisal and small tract determination procedures were sent to the field personnel for implementation.

In 1980, a formal decision on small, high-rent tracts was issued. These tracts were divided into two types, and different procedures for evaluating minimum acceptable bids for each were recommended. These procedures were in effect from December 1980 to September 1982, with publication of interim procedures that strengthened the Department's ability to obtain FMV.

Also in 1980, preference shifted to the use of the comparable sales approach for FMV estimation. Between 1971 and 1980, few Federal leases were sold or issued, and the Department had little data from private transactions for comparable sales analysis. However, as coal leasing increased, more sales data became available and the use of the comparable sales method increased.

As part of a Department effort to streamline procedures, the Conservation Division of the USGS recommended the consideration of competition as an acceptance factor when determining FMV. In early 1982, the Department developed procedures to allow the competitive market to have an input into determining FMV.

For the Powder River region lease sale in 1982, it was decided to make the final tract value estimations after all bids had been examined. Presale estimates of values were based on one comparable sale. Monetary adjustments representing the physical differences between the subject tracts and the comparable tract were made using a computer program. In order not to preclude legitimate potential bidders from bidding, a decision was made not to release the presale estimates of tract values to the public. Instead, the tracts were grouped into four categories with a different entry level or floor bid for each category. Published entry level bids were based on cents per ton of recoverable coal, except for one category of \$25 per acre (the regulatory minimum). Post-sale evaluation guidelines were adopted to consider the presale values, the competition at the sale, and special considerations.

Following the Powder River regional coal lease sale, a number of actions were taken by the Department to improve the coal lease evaluation procedures. In the summer of 1982, revised Federal coal management regulations were adopted which prescribed leasing by sealed bidding only and a \$100 per acre minimum bid.

In September 1982, the Department adopted interim lease sale procedures that called for structurally competitive tracts to be offered at a minimum bid of \$100 per acre and structurally uncompetitive tracts to be offered at a minimum bid that would constitute a representative market value, but in no event be less than \$100 per acre. Fair market value was to be determined after the sale using competition where it occurred and comparative analysis where competition did not occur. The interim procedures removed any special circumstances from the recommendation to the sale panel and relegated them to comments on the recommendation.

Final procedures were adopted in July 1983 and implemented on the Fort Union coal sale. The procedures were as follows: First, a dated and sealed presale evaluation was prepared. Second, no hints would be given bidders as to the presale value estimates; all leases would be offered at a minimum bid of \$100 per acre. Third, tight security would be instituted concerning the Department's reservation prices and the number



and identity of bidders until the bids were opened publicly. Fourth, a post-sale bid evaluation would occur in which acceptance of bids, if any, would be based on the average of two or more substantive bids (of at least 25 percent of the presale estimate) and the presale estimate. Tracts accepted under this process became available as comparable tracts to be used, as appropriate, to estimate the value of tracts receiving only one bid. A complete sale panel decision document was required, and all reservation prices on tracts not sold remained confidential.

#### 1.4 STRUCTURE OF THE GUIDE

The valuation process consists of developing data, selecting an appraisal method, and integrating the information to develop an estimation of value. Section 2 discusses data requirements for Federal coal property/right appraisal. The data required to form a substantive foundation for FMV estimation are discussed, potential data sources are presented, and data documentation requirements are delineated. Alternative procedures for property/right appraisal are presented in Section 3. Methods and models that lead to value estimation are examined. Section 4 discusses the preparation of the appraisal report. In Section 5, the post-appraisal process is presented. It includes a discussion of the presale appraisal review process, procedures for post-sale analysis, and requirements for the post-sale review.

## 2. DATA REQUIREMENTS

### 2.1 INTRODUCTION

The purpose of this section is to discuss the data requirements for value estimation of a Federal coal property/right. The nature of the appraisal process requires the search for specific information prior to the selection of an appropriate appraisal procedure; that is, the RET will have to evaluate the quantity and quality of the data available before it can make a determination to proceed with the comparable sales approach or to proceed with the income approach. For example, an evaluation of comparable sale transactions may reveal that insufficient information is available to adjust differences in property attributes or to substantiate arm's-length transactions. Under this condition, the valuation process is better served by proceeding with the income approach. Once a determination is made on an appraisal method, a data base of specific information is further developed from which a reliable estimate of FMV may be drawn.

Data requirements fall into two broad categories: economic or market data and technical data. Economic or market data are developed to evaluate intermediate and long-term demand for the coal type, to evaluate expected price levels and trends, and to develop a body of data on prior transactions of similar properties. Technical data are developed to evaluate coal characteristics, to evaluate the income-producing potential of the tract, and to compare tract characteristics with similar coal properties.

Since appraisals should be made with the recognition that the estimation of value may be contested, the RET must ensure that the valuation is based on reliable data and that inputs and assumptions used in the appraisal process are sufficiently documented with the clear rationale used to derive those inputs. The RET also must ensure the confidentiality of sensitive information.

The purpose of developing a data base is to provide a solid foundation for the estimation of value. The discussion that follows presents the types of data the RET will find useful to provide a proper basis for preparing an appraisal. Much of these data will play an essential role in the appraisal process; other data will be supplemental. Some data will be easy to collect or develop; other data will be difficult to obtain. It is not necessary to acquire all the data elements described below to proceed with the appraisal process. It is necessary, however, that a sufficient body of data be developed to support adequately the estimation of value indicating the rationale for the use of data. Without sufficient data and rationale for the use of the data, the appraisal process cannot proceed.

The RET will receive geologic and technical data developed by the District and Area office geologist and mining engineer. (An overview of appraisal responsibilities is shown in Fig. 2.1.) These data, in the form of geologist's and mining engineer's reports, are reviewed for conformance to Bureau of Land Management (BLM) data adequacy requirements and adjusted as required. The reports also are to be reviewed by the RET to ensure that sufficient data are available to support the valuation of the specific Federal coal property/right. Since the geologic and technical information contained in these reports form the basis for property/right valuation, questions or clarification concerning the data are to be resolved by the appropriate Deputy State Directors.

The RET will collect supplementary information, as required, to further develop site-specific characteristics. The RET may use informed judgment to infer data from limited information; however, the rationale for developing the data must be stated. Data received from the District and Area offices, as well as supplementary data, will be organized into economic data and technical data reports that document the data, data sources, and assumptions used to develop the data. The final reports will contain a statement certifying the accuracy and adequacy of the data. The reports will contain the minimum information required to replicate the analysis. Supporting or raw data need not be included;

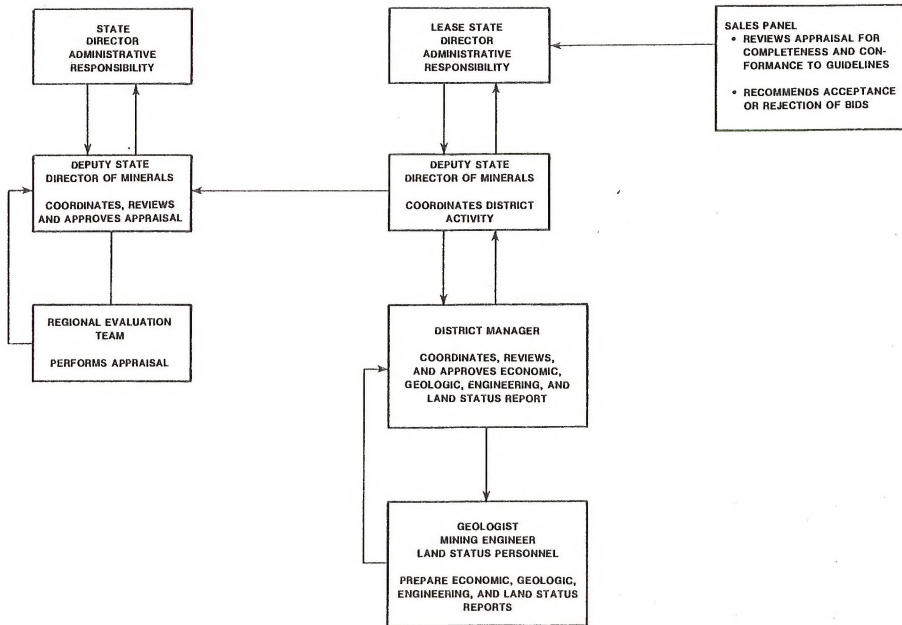


FIGURE 2.1 APPRAISAL RESPONSIBILITIES

however, these data should be referenced in the report to maintain an auditable link to the data.

## **2.2 ECONOMIC DATA REQUIREMENTS**

The purpose of economic data is to provide information concerning regional trends in coal demand, prior sales of similar coal properties, and economic or market-oriented data specific to the Federal coal properties/rights being appraised. The data provide information concerning possible trends from which judgments concerning value indication may be discerned. In addition, the information can measure the uncertainty in the estimated value by providing an expected range of data values used in the valuation process. For instance, the data can provide a basis for estimating input ranges to be used in Monte Carlo simulation techniques (discussed in Section 3.3.7).

The market analysis prepared jointly by the Washington and regional offices establishes the foundation for assessing the intermediate and long-term outlook for in situ and produced regional coal demand. The analysis should be supplemented with data that reflects the uniqueness of the property being appraised. Supplemental data include information concerning mines proximate to the property, factors affecting demand for the coal type, expected coal price trends, and information concerning prior public and private transactions of similar coal properties.

### **2.2.1 Data Related to Nearby Mines**

Supplementary information for evaluating market strength or weakness should be obtained for nearby mines if available. These data include alternative markets, transportation access and costs (which affect the geographic range of coal market activity), coal type and quality, coal prices, production costs, and mining method. Additional information that further defines market strength or weakness includes capacity utilization and operating schedule (capacity can be increased or decreased in response to market conditions). These data will be available from the market study.



The purpose of obtaining these data is to develop quantitative and qualitative criteria for evaluating regional coal production activity. Current coal production activity can provide important information concerning the current and intermediate-term outlook of the regional coal market. This information, in combination with coal demand projections, establishes a basis for assessing potential interest in the Federal coal property/right.

### **2.2.2 Regional Demand**

Supplementary information for evaluating regional demand should be obtained if available. The market analysis conducted as part of the regional Federal coal leasing program will be the basis for intermediate and long-term projections of coal demand. This information may be supplemented with the following data:

- Planned near- and mid-term additions to the coal-fired capacity of regional utilities.
- Planned expansions and conversions of large industrial coal users.
- Export potential of the coal type of the Federal coal property being appraised.

Although not explicitly required for estimating regional coal demand, the data, in combination with existing coal demand forecasts, can assist in narrowing the scope of published coal demand projections to the coal type of the property appraised. The data also provide a source of information to verify published coal demand projections.

### **2.2.3 Coal Price Trends**

Regional information concerning past and new contract coal prices by coal quality, mining method, and end user should be obtained if available. This information will assist in developing future price expectations of coal for the Federal coal property being appraised. Future coal price trends may be extrapolated from past data or, if

sufficient data are available, regression analysis can be applied to estimate future coal prices. Also, empirical sources of coal price-quality relationships for coal characteristics (e.g., Btu content, sulfur, and ash) should be developed so that quality adjustments can be made to prices. Several State, Federal, and private sources provide data for f.o.b. mine price and c.i.f. delivered price. New contract price information should be obtained if available.

#### 2.2.4 Past Public and Private Coal Sale Information

Information concerning prior public and private coal property transactions should be obtained if available. Transactions should be characterized by location, coal type and quality, geologic conditions, geographic conditions, mining conditions, proximity to transportation, property status, and other property characteristics that can be used to assess comparability to the Federal coal property being appraised. The information can be obtained from local, State, and Federal offices, as well as private users and producers and trade journals. These data can be weighted according to how representative the data are to the specific situation, or they may be averaged. The rationale for weighting or averaging must be given.

### 2.3 TECHNICAL DATA REQUIREMENTS

The purpose of technical data is twofold: (1) to provide the foundation for determining the income-producing potential of a property or (2) to provide the essential technical information to compare characteristics of a property being appraised with characteristics of similar properties for which there are prior transactions. The extent to which these data are collected depends upon (1) the availability of data and the certifying body's judgment that an adequate data base is available to conduct a meaningful appraisal; (2) the RET's and District and Area geologist's and mining engineer's assessment of available data; and (3) the ability to provide adequate rationale for assumptions inferred from limited data.

### 2.3.1 Site Minability and Cost Data

Geologic, engineering, and cost data should be developed for the property being appraised and properties for which prior sale transaction information is available. The purpose of these data is to provide the RET with sufficient information to either specify a mine plan for the property or to compare salient property characteristics between the property being appraised and prior public or private coal sale transactions. Geologic and engineering property information that should be developed, if available, are:

- Geologic properties of the tract, including coal type, coal quality and physical properties of coal, interburden, and overburden, as well as conditions that affect the minability (e.g., special water problems or rock mechanics).
- Geometric characteristics of the tract, including areal extent, continuity, thickness, and depth of the deposit.
- Geographic characteristics of the tract, including location, topography, and surface conditions.

The extent to which the data are developed depends upon the appraisal method. More or less detail may be required for the various approaches. For instance, the information above provides only a portion of the data required by the income approach to evaluate the property's income producing potential. Consequently, additional information should be obtained: equipment requirements and costs, regional labor rates, severance and other taxes, recovery factors, and other factors affecting mine economics, as specified by the appraisal method. Additionally, different types of data can be used, depending on the type of appraisal.

### **2.3.2 Property Status Data**

A legal description of the property should be developed. The description should include boundary information and other pertinent title and record data obtained from public offices, deed depositories, or other sources of public records. Property status must be delineated prior to valuation since it affects either the estimation procedure or the applicability of prior transactions of comparable properties to the appraisal process. For the purpose of Federal coal property valuation, each property may be classified as one of the following tract types: a single tract that constitutes a mining unit (MU) for a new mine operation, a single tract that constitutes a portion of an MU for a new mine operation, or a single tract that constitutes an increment to an existing mine operation. These classifications are discussed further in Section 3.4.

### **2.4 DATA SOURCES**

Table 2.1 lists potential sources of data useful to the appraisal process.

### **2.5 DATA DOCUMENTATION**

The data collected for use in the appraisal process will be organized into two reports, which will document the data required to support subsequent FMV estimation. The reports include an economic data report and a technical data report. The reports represent formal documentation of the data provided by the District and Area geologist and mining engineer, the Washington/regional office market analysis, and all supplemental information developed by the RET. Sensitive information can be included in the reports; however, the confidentiality of this information must be maintained. Reports that include confidential data must be stamped "proprietary". The final appraisal report should contain only a summary of the economic and technical data reports.

TABLE 2.1 POTENTIAL SOURCES OF APPRAISAL INFORMATION

DATA SOURCES	DATA TYPE
Department of the Interior	
Mineral Management Service	Royalty management data
Geological Survey	Coal resource data
Bureau of Mines	Mine costing data, mine technology
Office of Surface Mining	Mine-specific information
Department of Energy	Current and historical data on reserves, production, and consumption. Economic forecasts, electric power industry data
Department of Commerce	Coal export data
Department of Labor	Regional labor statistics, equipment price indexes
Department of Transportation	
Interstate Commerce Commission	Coal transportation data
State and Local Governments	Prior sales transactions, regional information
Coal Property Buyer/Sellers	Comparable sales data
National Laboratories	Forecasts and other coal-related data
Private Organizations and Services	Forecasts and other economic data
Private Producers and Consumers	Coal prices

### 2.5.1 Economic Data Report

The economic data report consists of three sections corresponding to the following categories of economic data: regional economic overview data, prior public and private coal transactions data, and input required for a DCF analysis.

The regional economic overview section documents the data and data sources used to assess the current, intermediate, and long-term outlook for the regional Federal coal reserves. This section summarizes the market analysis prepared jointly by the Washington and regional offices and presents the additional information obtained for nearby mines, regional demand, and coal price trends that are used to substantiate conclusions reached concerning the outlook for Federal coal. Also included is a discussion of how the data are used to set ranges for the valuation process.

The section should contain a comprehensive itemization of data used in the appraisal process. Data sources must be included to allow an independent review of the data collection activity. A discussion of the rationale for inferring data values in lieu of actual data also should be included.

The private and public coal transactions section documents the data and data sources used to develop candidate properties for comparable sales analysis. The information contained in this section includes:

- Description of the transaction, including the parties involved, date, and transaction terms.
- Legal description of the property, including tract name, township, range, and meridian.
- Property description, including transportation networks.
- Qualitative and quantitative description of factors affecting the transaction sale price, including market

conditions at the time of the transaction, coal type and quality, and property status.

The final section should contain data to be used in a DCF analysis to either adjust comparable sale transactions or to estimate the income-producing potential of the property. The information contained in this section includes:

- Regional salary structure, equipment prices, and other region-specific economic data.
- Theoretical and empirical information from which coal price-quality adjustments can be determined.

#### **2.5.2 Technical Data Report**

The technical data report consists of three sections corresponding to the following categories of technical data: geologic and geographic data, engineering data, and engineering mine plan.

The geologic and geographic section presents data for the coal property being appraised and for prior transaction properties. Geologic and geographic conditions at each property affect engineering considerations that influence mine development. In some cases, drilling and geologic survey data will be available. The source of the data must be documented, and maps and descriptions of geologic sections should be included if available. If these data are unavailable, the method for estimating geologic information must be presented and substantiated.

The engineering section documents the data from which minability considerations are drawn. The purpose of this section is to present the engineering data specific to property development. The data are used to develop the property mine plan used in subsequent analysis. Mine cost data are included in this section.

The final section presents several possible alternative mine plans for all properties (i.e., comparable properties and property to be appraised). The mine plans must be site-specific to account for all the

geotechnical and economic considerations relevant to the property since geologic, geostructural, and geographic conditions at the site, as well as economic factors, influence mine development. Generic mine plans should be avoided. Consideration should be given to mine development that may reasonably be applied to the conditions at the site.



### 3. METHODS AND MODELS USED FOR APPRAISAL

#### 3.1 INTRODUCTION

An appraisal is an unbiased estimate of the value of property. The appraisal process is a systematic approach to property valuation. It consists of defining data requirements, assembling the best available data, and applying an appropriate appraisal method. The principles of property valuation are presented in the Uniform Appraisal Standards for Federal Land Acquisitions and in The Appraisal of Real Estate (1983). These principles provide guidance to formulating procedures for estimating the value of a Federal coal property/right. The valuation of a Federal coal property/right is particularly complex since traditional indicators of market activity often are unavailable. Most Federal coal properties are first-time offerings to potential buyers; consequently, market information that normally results from prior sales of property may not exist. In its absence, the valuation procedure must extract from other available data a defensible estimate of Federal coal property/right value.

Two appraisal methods are discussed--the comparable sales approach and the income approach. In the comparable sales approach, the value of a property/right is estimated from prior sales of comparable properties. The basis for estimation is that the market will impute value to the subject property in the same manner that it determines value of comparable competitive properties. In the income approach, the value assigned to the property is derived from the present worth of future monetary benefits.

#### 3.2 COMPARABLE SALES APPROACH

The comparable sales approach is a method of estimating Federal coal property/right value that relates the value of the property being appraised to the value of recently sold comparable properties. The basis of the comparable sales approach relies on the following characteristics:

- Prices are determined in a competitive market.
- Prices result from the negotiation between knowledgeable buyers and sellers.
- Neither buyer nor seller is under undue pressure to buy or sell.
- Variations in property attributes between the property being appraised and the comparable properties can be accounted for through a monetary adjustment to each comparable property's value.

The approach may be applied when it is determined that a previous sale is comparable. A previous sale does not have to be identical in order to be comparable. As long as there is reasonable similarity, an adjustment can be made to account for the difference. For example, if a lease being appraised has coal of higher energy content (Btu) than a comparable sale, then the price paid for the comparable sale would be adjusted upwards.

### **3.2.1 Overview of the Comparable Sales Approach**

The general procedure for applying the comparable sales approach is as follows (Fig. 3.1):

- **Data Collection.** Extensively research sources of comparable sales transactions to obtain information about transactions of similar properties. Data requirements for comparable sales are discussed in Section 2.
- **Eligibility.** Verify the accuracy and completeness of information and evidence of a transaction between knowledgeable participants not obligated to buy or sell.
- **Selectability.** Review the property attributes for similarity to the property being appraised, and determine whether required adjustments can be made.

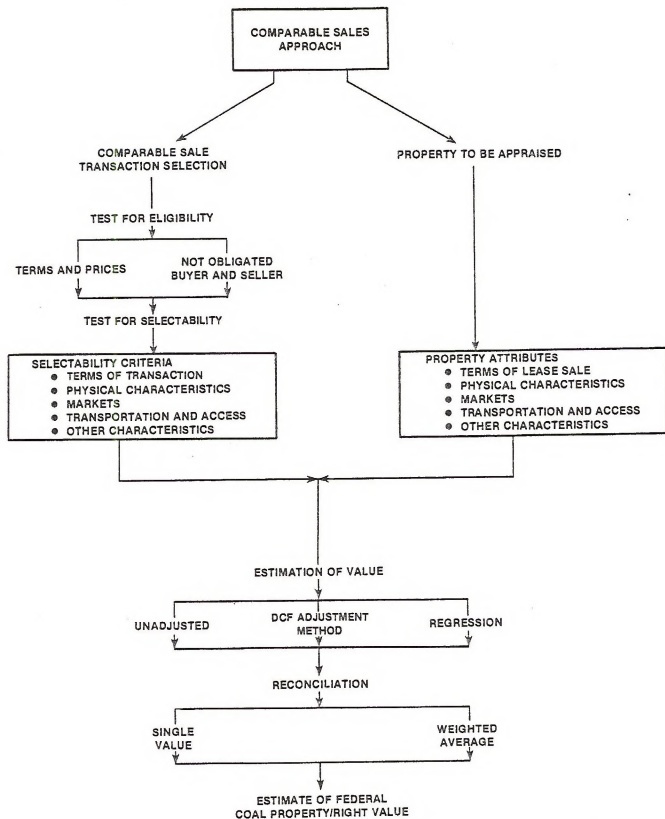


FIGURE 3.1 OVERVIEW OF COMPARABLE SALES APPROACH

- **Estimation of Value.** Estimate value of offered property using either unadjusted or adjusted comparable sale transactions or statistical regression of comparable sale data.
- **Reconciliation.** Reconcile multiple estimates of value into a single indication of value.
- **Documentation.** Document the process and rationale used to estimate FMV.

### 3.2.2 Eligible and Selectable Comparable Sale Transactions

The Uniform Appraisal Standards for Federal Land Acquisitions provides criteria to be considered when evaluating a prior transaction as a comparable:

- Time interval between sale date and appraisal date.
- Motivation of sales transaction.
- Similarity in locational aspects.
- Similarity in use and intensity of use.
- Physical and economic similarities.

The first step in the comparable sales approach is to determine whether a prior transaction is truly comparable. The test for comparability is a two-tiered approach. First, the RET determines if the transaction is **eligible**. Eligible transactions then are tested for **selectability**. Candidate comparable sale transactions are screened for conformance to eligibility and selectability criteria. Transactions that meet the criteria can be used as comparables. The RET should be prepared to defend the selection of comparable sale transactions. Eligibility and selectability criteria are described below.

### 3.2.2.1 Eligible Transactions

The following criteria are used to determine eligible tracts:

- **Transaction Identification.** The transaction identification should be based on an extensive search. Evidence of the search should be documented. This evidence should include details on where property records were obtained and how supporting information was obtained. Potential sources of information include Federal coal lease sales, state and local offices, Indian tribes, and private sales.
- **Transaction Terms and Price.** The terms and price of the transaction must be verified and documented.
- **Not-Obligated Buyer and Seller.** Evidence should be presented demonstrating that the transaction involved participants that were under no undue stimulus to buy or sell. If possible, the buyer or seller (preferably both) should be contacted to verify the terms and nature of the transaction.
- **Knowledgeable Buyer and Seller.** Evidence should be presented demonstrating that the transaction involved a knowledgeable buyer and a knowledgeable seller and that the transaction resulted in the "best" market price.

### 3.2.2.2 Selectable Transactions

A selectable transaction is an eligible transaction that can be used without adjustment, or it is an eligible transaction to which a price adjustment can be made to account for differences in property attributes. Property attributes to be compared are as follows:

- **Time of Sale and Market Conditions.** Recent transactions are preferred since market conditions may have changed between the transaction date and the appraisal date.

- **Terms of Sale.** Value is normally stated in terms of cash, or its equivalent, payable at the time of sale. The terms of sale of the property being appraised can differ from the terms of the eligible transaction. The differences should be evaluated.
- **Physical Characteristics.** Physical characteristics (e.g., stripping ratio, seam thickness, depth to deposit, continuity) influence property value, and differences must be evaluated.
- **Coal Characteristics.** Differences in Btu content, sulfur content, ash, and other coal quality characteristics affect marketability and must be evaluated.
- **Production Scheduling.** Coal value is affected by the timing and rate of production, and differences should be evaluated.
- **Access to Property and Transportation.** Access to the property and proximity to transportation and markets affect coal value.
- **Type of Market.** Consideration must be given to the type of market for the coal. Differences in the market for the coals must be evaluated.
- **Other Factors.** Other factors that may cause value differences between the tracts should be evaluated for similarity.

### 3.2.2.3 Special Considerations

Certain transactions are not normally considered acceptable evidence of value. Some transactions must not be used in appraisals; others may be used if better data are unavailable. If a "questionable" transaction is used, the RET must explain the basis for the price paid and present clear evidence as to why the transaction represents a useful

indicator of value. Transactions that cannot be used as comparable sales include sales that do not show evidence of a buyer and seller not obligated to buy or sell (e.g., condemnation sales or sales where the threat of condemnation entered into negotiations). Sales between interrelated companies should not be used unless it can be shown that the sale represents an arm's-length transaction. Sales by government organizations that had objectives other than receipt of market value (e.g., industrial development) should not be used unless it can be ascertained that competition among bidders in these sales was itself sufficient to ensure receipt of FMV.

### **3.2.3 Comparable Sales Estimating Method**

Comparable sale transactions can be used to estimate the value of an offered coal property by any of three alternative approaches: unadjusted transactions, DCF adjusted transactions, and regression analysis. The simplest approach is the use of one or more unadjusted comparable sale transactions to estimate coal property value. An unadjusted transaction can be used when it appears that there is sufficient commonality between comparable and offered property characteristics that the unadjusted comparable value provides a reasonable estimate of offered property value. The second approach is to adjust one or more comparable sale transactions to account for differences in property characteristics. And the third approach is to develop a regression equation (using comparable sales transaction data) that relates offered property value to the property's characteristics. Each approach is discussed below.

#### **3.2.3.1 Unadjusted Transactions**

The comparable sales approach involves comparing characteristics of the comparable sale transaction and those of the property to be appraised. If the characteristics of the comparable sale transaction closely match those of the offered tract, the unadjusted transaction price may be used as an estimate of value.

The RET should search for comparable properties that have similar physical characteristics to the offered property (e.g., geologic, geographic). These properties then are compared for similarity between other property/transaction characteristics, as discussed in Section 3.2.2. Individuals familiar with the regional coal activity may provide an indication of which comparable properties are similar to the offered property.

An unadjusted transaction price can be used when the characteristics between the comparable property and the offered property are sufficiently similar that an adjustment to the transaction price is unnecessary. Single or multiple unadjusted prices may be used to estimate offered property value. The reconciliation of multiple unadjusted prices to a single indication of value is discussed in Section 3.2.4.

#### **3.2.3.2 Adjusted Transactions (DCF Method)**

An adjusted transaction is used if it is necessary to account for differences between the characteristics of the comparable property and the offered property. Various methods for adjusting comparable sale transaction values to estimate offered tract value are available. In this section, the DCF adjustment method, which estimates the financial impact of differences in property characteristics, is discussed.

Past BLM practice has been to determine individual arithmetic adjustments for each value-influencing characteristic that differs between the offered and comparable properties. The individual adjustments are summed to convert the comparable sale value to an estimate of offered property value. This method is commonly applied in appraisals. An example is shown in Exhibit 3.1.



### Exhibit 3.1

Offered tract has lower stripping ratio and Btu/lb than comparable tract.

Comparable Sale Price	3 cents per ton
+ Value stripping ratio difference	+1 cents per ton
+ <u>Value coal Btu/lb difference</u>	<u>-3 cents per ton</u>
Offered tract value estimate	1 cents per ton

The individual value differences in Exhibit 3.1 are determined by the changes in a DCF model output for a "typical" mine in the region when the stripping ratio and Btu/lb are individually altered by the respective differences between the offered tract and the comparable tract. While this approach is simple to apply, there is some concern with its accuracy because it ignores potential interrelationships between property characteristics and also assumes that both the comparable property and the tract being evaluated are well modeled by a typical regional mine. Accordingly, an alternative adjustment procedure that will mitigate these concerns is recommended, as follows. First, estimate a DCF net present value (NPV) for each tract, using a hypothetical most-likely mine plan. Next, apply either of two adjustment methods to estimate a value for the offered tract.

In the first adjustment method, an arithmetic adjustment to the comparable sale transaction price is performed as follows:

- Calculate the difference between the NPVs of the offered and comparable tracts.
- Add the difference to the comparable sales actual value.

The result is an estimate of the value per ton of the offered tract.  
The arithmetic adjustment method is illustrated in Exhibit 3.2.

### Exhibit 3.2

#### Arithmetic Adjustment Method

1. Calculate the difference between offered tract and comparable tract NPVs.

Offered tract NPV	4.5 cents per ton
- <u>Comparable sale tract NPV</u>	- <u>6.0 cents per ton</u>
Arithmetic adjustment factor	- 1.5 cents per ton

2. Add the difference to the comparable sale price.

Comparable sale actual price	3.0 cents per ton
+ <u>Arithmetic adjustment factor</u>	- <u>1.5 cents per ton</u>
Offered tract value estimate	1.5 cents per ton

In the second approach, a proportional adjustment to the comparable sale transaction price is performed as follows:

- Calculate the ratio between the NPV of the offered tract and the NPV of the comparable tract.
- Multiply the comparable sale actual value by the ratio.

The result is an estimate of value per ton of the offered tract. The proportional adjustment method is illustrated in Exhibit 3.3. The proportional adjustment method currently is under study. The arithmetic adjustment method is the preferred approach until the study is completed and evaluated.

### Exhibit 3.3

#### Proportional Adjustment Method

1. Calculate the ratio between offered tract and comparable tract NPVs.

Offered tract NPV	4.5 cents per ton
÷ <u>Comparable sale tract NPV</u>	÷ <u>6.0 cents per ton</u>
Proportional adjustment factor	0.75

2. Multiply the comparable sale price by the ratio.

Comparable sale actual price	3.0 cents per ton
× <u>Proportional adjustment factor</u>	× <u>0.75</u>
Offered tract value estimate	2.25 cents per ton

In each adjustment method, the adjustment is determined by modeling each tract as an income producing property. A net present value of annual cash flow is calculated from revenues and costs derived from the model. Stated briefly, the NPV is estimated using a DCF analysis as follows:

- Develop a mine plan for the property.
- Develop annual costs and revenues based on the mine plan and expected coal prices.
- Select a discount rate and compute the NPV of the annual cash flow. The NPV is a measure of tract value.

The procedure for estimating NPV using the DCF method is discussed in detail in Section 3.3.

### 3.2.3.3 Regression Analysis

Regression analysis is an alternative method for estimating value. Application of multiple regression procedures determines an expression of price in terms of independent characteristics that contribute significantly to property value. This application requires sufficient data to develop statistically significant results. The estimation procedure is as follows:

- Collect data concerning property value (price) from past sales and each attribute contributing to value. Analyze the data to determine if the data base is sufficient to provide statistically significant results.
- Apply multiple regression procedures to determine an expression of property value in terms of the property attributes.
- Estimate value by applying the attributes of the Federal coal property being appraised to the regression equation.

Regression analysis may be difficult to implement for coal property/right evaluation because the data required for implementation may not be available. However, as more comparable sales data become available, the necessary data base may be developed. Regression analysis is illustrated in Exhibit 3.4.

### Exhibit 3.4

An estimate of FMV of a Federal coal lease property is required. Recent sales of virtually identical coal properties are available in which the only significant difference between each property is the depth to the coal seam. To estimate FMV, comparable sales data are obtained that relate sale price to depth to deposit, as listed below. The depth to deposit of the Federal property is 138 feet.

Sale Price (cents per ton)	Depth to Deposit (feet)	Sale Price (cents per ton)	Depth to Deposit (feet)
7.2	150	8.8	154
7.5	140	8.8	194
7.6	132	8.8	194
7.7	151	9.0	161
7.8	139	9.0	171
7.9	154	9.0	194
8.0	164	9.0	194
8.0	168	9.0	194
8.2	152	9.1	158
8.2	173	9.1	167
8.4	148	9.1	171
8.6	146	9.4	171
8.6	148	9.4	172
8.6	178	9.7	175
8.7	147	9.7	177
8.7	170	9.7	194
8.7	170	9.9	201
8.8	137	9.7	207

Simple linear regression formula:  $V = a + b D$

where

$V$  = estimated property value

$D$  = depth to deposit

Applying the linear regression technique:

$a = 4.9$

$b = 0.023$

and

$V = 4.9 + 0.023 D$  (cents per ton)

For the tract being appraised  $D = 138$  ft. Thus,

$V = 4.9 + 0.023 (138)$

$V = 8.1$  cents per ton

Fair market value is set equal to the calculated price: FMV = 8.1 cents per ton.

### 3.2.4 Reconciliation of Indicated Values

The final step in the comparable sales approach is the reconciliation of estimated (unadjusted or adjusted) values into a single indication of value of the property being appraised. In determining a single value from a set of estimated values (value indications), the RET may give more weight to specific estimated values if the values are more representative of FMV. For example, more recent transactions may be preferred to older transactions, or a particular transaction may differ in only one attribute. Regardless of the method of reconciliation used, its purpose is to provide a single estimate of property value. The RET, therefore, should provide a clear rationale for the approach to reconciling the indicated values. Values estimated by different methods should not be reconciled together; that is, unadjusted estimates should not be combined with adjusted estimates to produce a single indication of value. One of the following reconciliation methods may be used:

- A single estimate of property value may be selected from alternative value indications if, in the RET's judgment, it is the only meaningful indication of property value. Basing an estimate of value on a single observation generally is undesirable unless it can be shown that the observation is highly informative and clearly superior to others.
- Two or more value indications may be combined into a single estimate using a weighted averaging technique. When a weighted average is used, the rationale for deriving a weighting scheme must be documented.

### 3.3 INCOME APPROACH

The use of comparable sales is the most direct and accurate method of estimating value. However, in the absence of comparable sales, the income approach, which measures the value of a property's earning potential, is a viable alternative. The value imputed to a Federal coal property is determined by the expectation of future benefits.

The income approach attempts to quantify these benefits into a single indication of value by converting future monetary benefits to present value at a specified discount rate. The process of converting future benefits to present value is called discounting.

The income approach estimates NPV of a Federal coal property/right by discounting projected annual cash flow to the present. The projected annual cash flow is determined from projected annual revenue, capital and operating costs, taxes, and other expenses. The data required to implement the approach are based on the economic and engineering reports discussed in Section 2. This information is used to project annual revenue and cost estimates for property development.

### **3.3.1 Overview of the Income Approach**

The general procedure for applying the income approach is as follows (Fig. 3.2):

- **Assemble Data.** The economic and engineering reports provide the economic, market, and technical data.
- **Develop "Best" Mine Development Plan.** Alternative mine plans contained in the engineering report are developed further to determine the "best" mine development plan for the property. The RET must be able to defend the plan as the "best" development plan for the tract.
- **Develop Data.** Capital and operating costs, production rate, development schedule, and projected revenues are developed. The RET must be able to defend the selection of data.
- **Integrate Data.** Economic and cost data are integrated to develop estimates of annual cash flow.
- **Discounted Cash Flow Analysis.** The NPV of future benefits is determined by the DCF method.

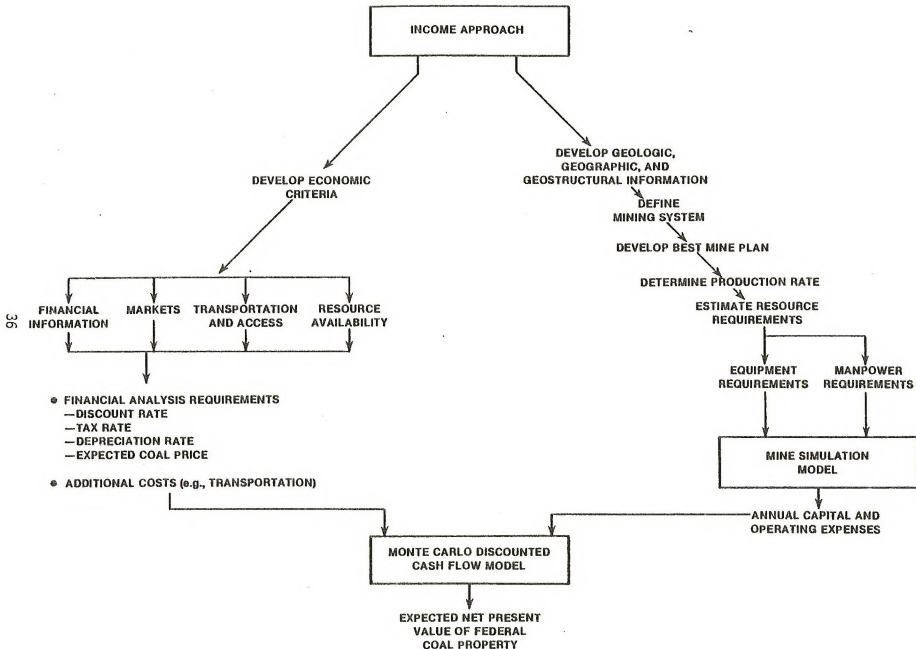


FIGURE 3.2. OVERVIEW OF INCOME APPROACH



### **3.3.2 Mine Plan Selection**

Alternative mine plans included in the engineering report provide the basis for determining a detailed mine development plan for the property. The property mine plan should represent the "best" development method for the tract as determined by tract-specific characteristics. The RET should be prepared to defend the development plan.

### **3.3.3 Determining Revenues**

The production schedule developed from the mine plan should be combined with estimated or known coal price information to determine expected revenues associated with the mine operation.

### **3.3.4 Determining Mining Costs**

The mining costs developed for the property mine plan include capital and operating expenditures associated with the mine operation. Capital costs and operating expenses are estimated from individual cost elements.

#### **3.3.4.1 Capital Cost Elements**

Capital cost elements include expenditures for services, construction, and equipment associated with preproduction activity, mine development, and production. Capital cost elements are as follows:

- **Premining Studies.** The premining studies cost element includes expenditures associated with exploration, environmental, and engineering studies. Exploration cost includes all field activity required to define the resource sufficiently for project feasibility analysis and mine design. Environmental cost includes the cost of developing baseline environmental data and establishing mitigation protocol and monitoring activities to ensure compliance with Federal and State regulations. Engineering cost is the cost of engineering design activities, including contractor fees for engineering

design and contractor management. If specific cost data are unavailable, the premining cost element may be estimated as 10 percent of total capital cost.

- **Site Preparation and Surface Facilities.** Site preparation cost includes expenditures to clear and grub the area in preparation for mining and facility siting. Also included are costs to provide access to the mine site and to upgrade existing roads. Surface facilities cost includes costs associated with the construction and supply of surface facilities required to support the mining operation. This includes construction costs for general offices, engineering offices, changehouse, maintenance shops, warehouses, and load-out facilities, as well as fixtures and equipment required to support the facilities. Also included are expenditures for the purchase and installation of wells, pumps, treatment facility, piping distribution system, and other items required to supply potable water to the mine site. The surface facility cost element also includes the cost of a mine drainage system and facilities to store explosives, fuel, and water. Data for estimating these costs are provided in industry cost manuals (e.g., Means Building Construction Cost Data), vendors, and mine cost studies.
- **Mine Equipment.** Mine equipment cost includes purchase cost of all equipment delivered to the site and spares required to sustain production rates specified by the mine plan. Cost includes major equipment items and auxiliary items such as fire protection vehicles, small trucks, and other similar items used directly in the mining operation. Equipment costs can be based on vendor quotes.
- **Preproduction Development.** Preproduction development cost includes the cost of all activities required to bring the mine to full production. For surface

mining, these activities include, in part, the drilling, blasting, loading, hauling, and stockpiling of topsoil and overburden prior to ore production. For underground mining, the activities include the development of drifts prior to production.

- **Indirect, Administrative, Contingency, and Working Capital.** Indirect cost accounts for miscellaneous costs not directly attributable to a specific work item. Administrative costs are the general overhead and administrative costs associated with nonproduction activity. Contingency is an allowance to provide for unpredictable costs not known at the time of the estimate. Working capital is the capital required to meet payroll expenses and other billings for material inventory, to carry accounts billings for material inventory, and to carry accounts receivable until revenue is generated. Indirect and administrative costs each can be estimated as 2 percent of total capital investment. Contingency can be estimated as 10 percent of the capital cost of equipment plus 15 percent of the capital cost of facilities. Working capital usually is estimated as 90 days operating and administrative costs. Note that working capital is not an allowable tax deduction. It is treated as an initial capital cost and is returned as "salvage" at some future date.

#### 3.3.4.2 Operating Cost Elements

Operating costs are expenditures for labor, material, maintenance, utilities, indirect, and fixed costs incurred during mining activities. Operating cost elements are as follows:

- **Labor.** Labor cost includes wages for hourly and salaried personnel. Salaried and hourly personnel requirements are determined from production and equipment requirements

specified for the mine plan. Hourly labor manpower requirements should be based on regional operating schedules and labor practices. Additional hourly labor personnel should be added to account for vacation, sick leave, and absenteeism. Wage rates should be based on rates prevailing in the region.

- **Equipment and Supplies.** Equipment supply cost includes expenditures for fuel, lubrication, and other supplies for mining equipment, as well as the cost of scheduled and unscheduled repairs. Equipment operating, maintenance, and supply costs may be estimated from vendor information.
- **Utility.** Utility cost is the cost for purchased electric power. Electric power requirements can be determined from estimates of electric power requirements of equipment and surface facilities. Utility cost should be based on prevailing rate schedules obtained from the utility serving the region.
- **Payroll Overhead.** Payroll overhead is estimated as 45 percent of direct labor cost.
- **Contingency, Indirect, and Fixed Cost.** Contingency represents the cost of unpredictable operating expenditures. It is estimated as 10 percent of the equipment operating cost plus 15 percent of the facilities operating cost. Indirect cost accounts for miscellaneous operating expense not directly attributable to a specific work element. It is estimated as 15 percent of the direct labor and supply costs. Fixed cost includes expenditures for workman's compensation, the cost of insuring mine property and equipment against loss, and the cost of insuring against personal injury and property damage liability. Fixed cost is estimated as 2 percent of the total capital investment.

Annual capital and operating costs are based on equipment requirements, manpower requirements, and development schedules derived from the engineering mine plan. These data, combined with projected coal price and other economic data, represent the input to the DCF analysis.

### 3.3.5 Discount Rates

The Department of the Interior currently uses a 10 percent real post tax rate of return as the discount rate for coal lease evaluation and will continue doing so pending the results of final studies in this area. The 10 percent post tax rate is derived from a 10 percent pretax real rate of return suggested by studies of the marginal rate of return on private capital, with canceling 2 percentile adjustments for taxes (-) and coal development risk (+). The discount rates under study may be derived from the weighted cost of capital, the default free rate plus adjustments, the marginal return on capital, and the comparable sales deduction.

#### 3.3.5.1 Weighted Cost of Capital

The weighted cost of capital is a micro-individual investment approach, although it has been employed on a broader scale. It involves the concept that the cost of capital to a firm is not constant nor sole source. Thus, allowances must be made for the cost of both debt and equity. Measuring the cost of debt is usually straightforward; however, measuring the cost of equity presents problems. Various capital-asset pricing models exist to approximate the cost of equity. The proportion of debt to equity financing is then used to get the weighted average cost of capital. Sometimes an attempt is made to get the anticipated proportions of debt to equity so the weighted cost of capital will reflect the marginal cost rather than an average. Adjustments for taxes are generally included in the measurement of the cost of debt.

### 3.3.5.2 Default-free Rate

The default-free concept is a simple, direct approach to arriving at a discount rate. It can be determined by either of two methods. The first method is the default-free rate (usually governmental instruments) plus adjustments for risk. The second is the default-free rate with risk accounted for in the cash flow model (also known as the certainty-equivalent approach). A wide variety of different subsets of each of these two general methods exists. The default-free rate is generally used as a macro-marginal discount rate, although it is also used in individual investment analysis.

Taxes and inflation are accounted for differently in the two commonly used methods: weighted cost of capital and default-free rate. Some firms compensate for taxes in the discount rate while others ignore taxes, citing recent research that shows the effects of taxes on discount rates to be negligible. Other analysts account for inflation by converting to "real" values, and others use nominal rates to avoid the systematic bias of inflation adjustments. The differences between the methods are mostly conceptual rather than in the actual discount rates that each method produces.

### 3.3.5.3 Marginal Return on Capital

The aggregate marginal return on capital averaged over a number of years is used as a discount rate. This rate is an aggregate of all corporate returns on new capital investments. It is not specific to one firm or industry. It differs from the two previous methods in that it is a return on capital (post-investment) rather than a rate (preinvestment).

### 3.3.5.4 Comparable Sales Deduction

If comparable property value or investment value is known, a discount rate can be determined from the discounted cash flow model. The discount rate becomes the unknown to be "solved for" in the discounted cash flow equation. Knowledge of the major components of the discounted cash flow model is essential for the computed discount rate to be

credible. This technique allows for an estimation of prevailing rates used by other firms.

### **3.3.6 Discounted Cash Flow Analysis**

Federal coal property/right value is estimated as the NPV of the projected annual after-tax cash flow of the mine operation. Annual after-tax cash flow is determined from the annual cash income (annual revenue - annual cost) and taxes. The NPV is the sum of the annual after-tax cash flows discounted to the present at a specific discount rate. Although conceptually simple, the application of the DCF method to mineral property valuation can be complex.

A successful estimation of NPV requires that the tax consequence of capital investment be handled properly. Consequently, decisions concerning the handling of deductions to determine taxable income become important considerations to the estimation process. Allowable deductions are subtracted from gross income to determine taxable income. Deductions include royalties, operating expenses, development expenses, depreciation, and depletion. Taxes are calculated as a percentage of taxable income. To derive annual cash flow, annual gross revenues in each year are reduced by cash outlays including tax payments.

The application of the income approach using the DCF analysis to estimate value of a Federal coal property/right is illustrated in Exhibit 3.5.

### **3.3.7 Probabilistic DCF Analysis**

To refine the estimate of value, some measure of uncertainty should be incorporated into the DCF process. Despite efforts to provide an accurate measure of property value through the estimation of its NPV, uncertainty is an important and unavoidable factor in the valuation procedure since it is impossible to obtain perfect information for all the DCF inputs, some of which depend on future events. Uncertainty can be included in the valuation procedure by using probabilistic methods. The simplest probabilistic method is to calculate the results of several



### Exhibit 3.5

Type Mining: Surface

Production Rate: 5,000,000 tons per year

Mine Life: 20 years

Coal Price: \$9.50 per ton

Royalty: 12.5 percent

Discount Rate: 10 percent

#### Capital Investment Summary (in Thousand Dollars)

Premining Studies and Site Preparation	4,000
Facilities	20,000
Equipment	30,200
Preproduction Development	2,500
Indirect, Administrative, and Contingency	17,200
Replacement Capital (in tenth year)	20,000

#### Annual Operating Cost Summary (in Thousand Dollars)

Labor (including overhead)	9,100
Supplies, Maintenance, and Power	11,800
Indirect, Fixed, and Contingency	6,250

#### Annual Cash Flow Summary (in Thousand Dollars)

Year	Capital Investment	Cash Flow	Present Worth Factor	Discounted Cash Flow
0	67,400	-67,400	1.0000	-67,400
1		11,716	0.9091	10,651
2		12,939	0.8264	10,693
3		12,674	0.7513	9,522
4		12,414	0.6830	8,479
5		12,347	0.6209	7,666
6		12,016	0.5645	6,783
7		11,824	0.5132	6,069
8		11,824	0.4665	5,516
9		11,824	0.4241	5,015
10	20,000	-5,885	0.3855	-2,269
11		11,356	0.3505	3,980
12		11,156	0.3186	3,554
13		10,956	0.2897	3,174
14		10,956	0.2633	2,885
15		10,956	0.2394	2,623
16		10,184	0.2176	2,216
17		10,184	0.1978	2,014
18		10,184	0.1799	1,832
19		10,184	0.1635	1,665
20		9,287	0.1486	1,380

Net Present Value (per ton) =  $1/\text{tons} \times \sum \text{Discounted Cash Flow}$

NPV = 26.0 cents per ton



alternative scenarios and to combine them by assigning a probability estimate of occurrence to each scenario. This procedure is illustrated in Exhibit 3.6.

### Exhibit 3.6

A market analysis prepared for the mine in Exhibit 3.5 indicates a 50 percent probability that the coal will sell for \$9.50 per ton, a 40 percent probability that the coal will sell for \$9.00 per ton, and a 10 percent probability that the coal will sell for \$10.00 per ton.

The net present value is computed for each selling price:

1. Scenario 1: Coal price = \$9.00 per ton  
(probability of occurrence = 0.4)  
NPV = 13 cents per ton
2. Scenario 2: Coal price = \$9.50 per ton  
(probability of occurrence = 0.5)  
NPV = 26 cents per ton
3. Scenario 3: Coal price = \$10.00 per ton  
(probability of occurrence = 0.1)  
NPV = 37 cents per ton

The probability weighted (expected) net present value is:

$$\text{NPV} = 0.4 (13) + 0.5 (26) + 0.1 (37) = 21.9 \text{ cents per ton}$$

An alternative probabilistic method is the application of the Monte Carlo simulation technique to the DCF method. This method requires the development of probability distributions for the input variables. Often, insufficient data limits the precise development of probability distributions; however, assumed distributions (normal, triangular, etc.) may be used based on an evaluation of the data. Repeated application of the DCF method using Monte Carlo simulation generates an NPV

distribution from which a single-weighted average (the expected NPV) can be determined.

### **3.3.8 Computer Models for Mineral Property Valuation**

#### **3.3.8.1 Monte Carlo DCF Computer Program**

The complexity of the DCF method for mineral property valuation has led to the development of specialized computer programs. The Coal Resource Economic Value (CREV) model is an example of a computerized DCF program that has been used for Federal coal lease evaluation.

The need to incorporate uncertainty in the valuation process resulted in the refinement of DCF computer codes to permit Monte Carlo simulation. Uncertainty in input values is handled by the Monte Carlo simulation program by using assumed probability distributions of input variables rather than point estimates. The simulation randomly samples each variable from its probability distribution and performs the DCF calculation. Repeated application of the simulation results in a frequency distribution of the output from which an expected value of NPV can be determined.

It is recommended that the GEN3 Simulation Model for Resource Policy Evaluation be used for Federal coal property/right appraisal. This model, in application, is similar to the CREV model previously used for valuation; however, it has the advantage of optional Monte Carlo simulation if uncertainty in distributions is to be included in the valuation process.

In performing Monte Carlo simulations, some combination of input values may yield negative NPVs. A negative NPV indicates either a reduced rate of return on investment (i.e., a rate of return less than the discount rate used in the simulation) or an actual loss, depending on its magnitude. In performing an appraisal, negative values will be included in the NPV distribution; however, they will be accounted for as follows: substitute the predevelopment cost whenever a negative NPV

goes below this level; i.e., it is assumed that unprofitable mines are not developed or are abandoned.

### **3.3.8.2 Mining Simulation Computer Program**

Mine simulation computer programs are available to assist the RET in developing annual capital and operating cost estimates. For example, surface and underground coal mining cost models developed for the Electric Power Research Institute (EPRI) present a computerized procedure for estimating detailed capital and operating costs and requirements of a proposed or existing mining operation. The surface mining cost model analyzes conventional area, contour, and open pit mining operations. The underground mining cost model analyzes continuous, conventional, and longwall mining systems.



TO THE REVIEWER:

The Linowes Commission examined the BLM's appraisal procedures and recommended that a Federal coal lease tract "captive" to a neighboring mine be appraised according to its value to the mine to which it is captive. In accordance with the Secretary's Review of Federal Coal Leasing (U.S. DOI, March 19, 1984) the discussion of appraisal of captive tracts is highlighted in the following section and public comment is specifically requested. In the discussion of Federal coal lease tract appraisal that follows, a captive tract is not a separate classification, but is grouped under a larger classification for appraisal purposes. This valuation procedure is consistent with the recommendations of the Linowes Commission.



### 3.4 APPLICATION OF APPRAISAL METHODS TO FEDERAL COAL LEASE TRACTS

In this section, the appraisal methods discussed above are applied to the valuation of Federal coal lease tracts. Three types of Federal coal lease tracts are described, and the use of the comparable sales approach and the income approach is discussed for each tract type. For convenience, the Federal coal lease tract types are identified as Type 1 tracts, Type 2 tracts, and Type 3 tracts. Each tract type is defined as follows:

- **Type 1 tract.** A single tract that constitutes an MU for a new mine operation. The tract contains sufficient reserves that can be developed and mined in an efficient, economic, and orderly manner with due regard for the conservation of coal resources and other resources.
- **Type 2 tract.** A single tract that constitutes a portion of an MU for a new mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be used with other contiguous reserves to create an MU for a new mine operation.
- **Type 3 tract.** A single tract that constitutes an increment to an **existing** mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be mined economically in conjunction with an existing mine operation.

This section describes the application of the comparable sales approach and the income approach to the estimation of FMV of each Federal coal lease tract type. First, the comparable sales approach is discussed. Comparable sales that may be used to estimate FMV are presented for each tract type. Then the steps required to apply the comparable sales approach are delineated. Next, the income approach is discussed, and the steps for applying the income approach are delineated. Finally,

other considerations required to apply the methods to the tract type are presented.

### **3.4.1 Valuation of Type 1 Tracts**

A Type 1 Federal coal lease tract is an MU for a new mine operation. Comparable sales that can be used to value Type 1 tracts include:

1. Sale of an entire MU for a new mine operation.
2. Sale of a portion of an MU for a new mine operation.

#### **3.4.1.1 Unadjusted Comparable Sales**

Use the unadjusted value of a comparable sale to estimate the value of a Type 1 tract when it can be shown that the attributes of the comparable tract are sufficiently similar to the attributes of the Federal tract that an adjustment to the comparable sale price to account for differences does not provide a better estimate of value. If an unadjusted comparable sale is used, set the FMV of the Federal tract equal to the selling price (per ton) of the comparable tract:

FMV = selling price per ton of comparable tract.

#### **3.4.1.2 Adjusted Comparable Sales**

Use the DCF-adjusted value of a comparable sale to estimate the value of a Type 1 tract when it is necessary to account for differences in tract attributes. If a DCF-adjusted comparable is used, set the FMV of the Federal tract equal to the adjusted selling price (per ton) of the comparable tract. The adjusted selling price is computed as follows:

1. Estimate the NPV of the comparable tract. The NPV of the comparable tract (MU) is estimated using a DCF analysis. First, a mine plan for the comparable tract is developed. Next, capital costs and annual operating costs are estimated. The costs and revenues are combined to determine annual cash flow. The annual cash flow is discounted to the present to



yield an estimate of the NPV of the comparable tract. The NPV is divided by the total tonnage of the MU to determine a value per ton.

$$\overline{\text{NPV}}_{\text{comp}} = \text{NPV}_{\text{mu}} / \text{MU tons}$$

2. Estimate the NPV of the Federal tract. The NPV of the Federal tract also is estimated using a DCF analysis, as described above. The NPV is divided by the total tonnage of the Federal tract to determine a value per ton.

$$\overline{\text{NPV}}_{\text{fed}} = \text{NPV}_{\text{fed}} / \text{tract tons}$$

3. Determine the adjustment to the comparable sale price. The comparable sale price is adjusted by either an arithmetic adjustment factor or a proportional adjustment factor. (Note: the proportional adjustment method currently is under study. Until this study is completed, the arithmetic adjustment method is preferred.) The adjustment factor is calculated as follows:

- a. Arithmetic adjustment factor:

$$D = \overline{\text{NPV}}_{\text{fed}} - \overline{\text{NPV}}_{\text{comp}}$$

- b. Proportional adjustment factor:

$$R = \overline{\text{NPV}}_{\text{fed}} / \overline{\text{NPV}}_{\text{comp}}$$

4. Estimate FMV. Set the FMV of the Federal tract equal to the adjusted comparable tract selling price.

- a. Arithmetic adjustment:

$$\text{FMV} = \text{comparable tract selling price (per ton)} + D.$$

- b. Proportional adjustment

$$\text{FMV} = \text{comparable tract selling price (per ton)} \times R.$$

### 3.4.1.3 Income Approach

Use the income approach to value Type 1 tracts when comparable sales data are unavailable. The income approach is discussed in Section 3.3 and is summarized as follows:

1. Develop a mine plan. A mine plan for the Federal tract is developed. The mine plan represents the development of the property in a reasonable and realistic manner. It is based on an assumed production rate and development schedule.
2. Develop cost data. Capital costs, annual operating costs, and projected revenues are estimated.
3. Develop annual cash flow. Annual cash flow is determined from revenues, costs, and taxes.
4. Estimate FMV of the tract. The NPV of the tract is determined from the annual cash flow using a DCF analysis. The FMV of the tract is estimated by dividing the NPV by the tract tonnage.

$$FMV = NPV_{fed} / \text{tract tons.}$$

The mine plans used in the estimation procedures are based on developing the property in a realistic manner; consequently, the most-likely mining method, development schedule, and production rate form the basis of the mine plan. Estimates of capital investment and operating costs proceed logically from the mine plan. All costs are based on current equipment prices and current labor rates.

The mine plans are developed for an MU. If a comparable tract is a portion of an MU, the value of the comparable tract is assumed equal to the value (per ton) of the entire MU.

An example of the valuation of a Type 1 tract is illustrated in Exhibit 3.7.

#### **3.4.2 Valuation of Type 2 Tracts**

A Type 2 Federal coal lease tract is a portion of an MU for a new mine operation. A Type 2 tract cannot be mined economically as an independent unit. Its value is derived from the value of the MU to which it is attached. Comparable sales that can be used to value Type 2 tracts include:

1. Sale of an entire MU for a new mine operation.
2. Sale of a portion of an MU for a new mine operation.

##### **3.4.2.1 Unadjusted Comparable Sales**

Use the unadjusted value of a comparable sale to estimate the value of a Type 2 tract when it can be shown that the attributes of the comparable tract are sufficiently similar to the attributes of the Federal tract that an adjustment to the comparable sale price to account for differences does not provide a better estimate of value. If an unadjusted comparable is used, set the FMV of the Federal tract equal to the selling price (per ton) of the comparable tract:

FMV = selling price per ton of comparable tract.

##### **3.4.2.2 Adjusted Comparable Sales**

Use the DCF-adjusted value of a comparable sale to estimate the value of a Type 2 tract when it is necessary to account for differences in tract attributes. If a DCF-adjusted comparable is used, set the FMV of the Federal tract equal to the adjusted selling price (per ton) of the comparable tract, as discussed in Section 3.4.1.2.

### Exhibit 3.7

Tract Type 1: The offered Federal tract is a single tract that constitutes a mining unit for a new mine operation.  
Offered Federal Tract

MU
250 MM Tons
Selling Price = 4¢ per ton

The offered Federal tract is a single tract that constitutes a mining unit of 250 million tons.

**Comparable Tracts**

**a. Comparable Tract 1**

MU
200 MM Tons
Selling Price = 4¢ per ton

The comparable tract is a prior sale of a single tract that constitutes a mining unit of 200 million tons for a new mine operation.

**a. Comparable Tract 2**

MU
275 MM Tons Total
Selling Price = 6¢ per Ton

The comparable tract is a prior sale of a 50 million ton tract that is a portion of a mining unit for a new mine operation. The combined tracts total 275 million tons.

#### Data Summary

Tract	Tons (in millions) in Tract      in MU		Selling Price	Calculated NPV
Federal tract	250	250	---	9 cents per ton
Comparable 1	200	200	4 cents per ton	6 cents per ton
Comparable 2	50	275	6 cents per ton	10 cents per ton

The three methods for valuing a Type 1 tract are as follows:

**I. Unadjusted Comparable**

The FMV of the Federal tract is set equal to the unadjusted selling price of the comparable tract.

1. Using comparable sale 1: FMV = 4 cents per ton.
2. Using comparable sale 2: FMV = 6 cents per ton.
3. Reconciliation of multiple values:

In this example, the use of two comparable sales to estimate FMV of the Federal tract leads to multiple estimates of values. When two or more comparables are used, the multiple estimates of value must be reconciled into a single indication of value. The RET may select a single value estimate from the multiple estimates if the estimate is highly informative and clearly superior to the others. Otherwise, the multiple estimates are combined using a weighted averaging scheme.

**II. Adjusted Comparable**

The FMV of the Federal tract is set equal to the adjusted selling price of the comparable tract.

1. Using comparable sale 1:
  - a. Estimate the value of the comparable tract using a DCF analysis. The calculated value is (see Data Summary above):

$$NPV_{comp} = 6 \text{ cents per ton.}$$

- b. Estimate the value of the Federal tract using a DCF analysis. The calculated value is:

$$NPV_{fed} = 9 \text{ cents per ton.}$$

- c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$D = \frac{NPV_{fed}}{NPV_{comp}}$$

$$D = 9 \div 6$$

$$D = 3 \text{ cents per ton}$$

or

2. Proportional adjustment factor

$$R = \frac{NPV_{fed}}{NPV_{comp}}$$

$$R = 9 \div 6$$

$$R = 1.5$$

## Exhibit 3.7 (Continued)

d. Estimate FMV.

1. Arithmetic adjustment (preferred)

$$\begin{aligned} \text{FMV} &= \text{comparable tract selling price (per ton)} + D \\ \text{FMV} &= 4 + 3 \\ \text{FMV} &= 7 \text{ cents per ton} \end{aligned}$$

or

2. Proportional adjustment

$$\begin{aligned} \text{FMV} &= \text{comparable tract selling price (per ton)} \times R \\ \text{FMV} &= 4 \times 1.5 \\ \text{FMV} &= 6 \text{ cents per ton} \end{aligned}$$

2. Using comparable sale 2:

a. The calculated value of the comparable tract is:

$$\overline{\text{NPV}}_{\text{comp}} = 10 \text{ cents per ton.}$$

b. The calculated value of the Federal tract is:

$$\overline{\text{NPV}}_{\text{fed}} = 9 \text{ cents per ton.}$$

c. The adjustment factor is:

1. Arithmetic adjustment factor (preferred)

$$\begin{aligned} D &= \overline{\text{NPV}}_{\text{fed}} - \overline{\text{NPV}}_{\text{comp}} \\ D &= 9 - 10 \\ D &= -1 \text{ cents per ton} \end{aligned}$$

or

2. Proportional adjustment factor

$$\begin{aligned} R &= \overline{\text{NPV}}_{\text{fed}} \div \overline{\text{NPV}}_{\text{comp}} \\ R &= 9 \div 10 \\ R &= 0.9 \end{aligned}$$

d. The estimate of FMV of the Federal tract is:

1. Arithmetic adjustment (preferred)

$$\begin{aligned} \text{FMV} &= \text{comparable tract selling price (per ton)} + D \\ \text{FMV} &= 6 + (-1) \\ \text{FMV} &= 5 \text{ cents per ton} \end{aligned}$$

or

2. Proportional adjustment

$$\begin{aligned} \text{FMV} &= \text{comparable tract selling price (per ton)} \times R \\ \text{FMV} &= 6 \times 0.9 \\ \text{FMV} &= 5.4 \text{ cents per ton} \end{aligned}$$

3. Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV.

### III. Income Approach

The income approach is used to estimate value when comparable sales data are unavailable. The process is identical to the method used in the adjusted comparable sales approach to compute the net present value of the Federal tract. The FMV is set equal to the computed NPV (per ton). In this example, the NPV of the Federal tract is calculated by the DCF method as 9 cents per ton; consequently,

$$\text{FMV} = 9 \text{ cents per ton.}$$

### 3.4.2.3 Income Approach

Use the income approach to value Type 2 tracts when comparable sales data are unavailable, as discussed in Section 3.4.1.3.

The mine plans used in the estimation procedures are based on developing the property in a realistic manner; consequently, the most-likely mining method, development schedule, and production rate form the basis of the mine plan. Estimates of capital investment and operating costs proceed logically from the mine plan. All costs are based on current equipment prices and current labor rates.

More than one MU may be possible for the Federal tract. Select the MU that results in the largest NPV. The value of the Federal tract (per ton) is determined as follows:

$$\overline{\text{NPV}}_{\text{fed}} = \text{NPV}_{\text{max}} / \text{MU tons.}$$

In the comparable sale approach, the value  $\overline{\text{NPV}}_{\text{fed}}$  is used to determine the adjustment factor. In the income approach, the FMV of the tract is set equal to  $\overline{\text{NPV}}_{\text{fed}}$ .

An example of the valuation of a Type 2 tract is illustrated in Exhibit 3.8.

### 3.4.3 Valuation of Type 3 Tracts

A Type 3 Federal coal lease tract is an increment to an existing mine operation. A Type 3 tract cannot be mined economically as an independent unit. Its value is based on its incremental value to the existing mine operation. Comparable sales that can be used to value Type 3 tracts include:

1. Sale of a Type 3 tract. The tract is an increment to an existing mine. The price should result from a transaction between a knowledgeable buyer and seller, neither of which were obligated to buy or sell.

### Exhibit 3.8

Tract Type 2: The offered Federal tract constitutes a portion of a mining unit for a new mine operation.

#### Offered Federal Tract

Federal Tract 20 MM Tons	MU 1	200 MM Tons Total
MU 2		

250 MM Tons Total

#### Comparable Tracts

##### o Comparable Tract 1

200 MM Tons
Selling Price = 4¢ per ton

The offered Federal tract is a portion of a mining unit for a new mine operation. In this example, the offered tract containing 20 million tons may be combined either with an adjoining tract containing 180 million tons or an adjoining tract containing 230 million tons.

The comparable tract is a prior sale of an entire mining unit for a new mine operation.

##### o Comparable Tract 2

MU	50 MM Tons Selling Price = 6¢ per ton
275 MM Tons	

The comparable tract is a prior sale of a portion of a mining unit for a new mine operation. The sale may have resulted from negotiation between the buyer and seller, or a competition among potential buyers (i.e., there may have been more than one possible MU), or a combination of the two.

#### Data Summary

Tract	Tons (in millions)		Selling Price	Calculated NPV
	In Tract	In MU		
Federal tract in MU 1	20	200	---	7 cents per ton
Federal tract in MU 2	20	250	---	9 cents per ton
Comparable 1	200	200	4 cents per ton	6 cents per ton
Comparable 2	50	275	6 cents per ton	10 cents per ton

The three methods for valuing a Type 2 tract are as follows:

#### I. Unadjusted Comparable

The FMV of the Federal tract is set equal to the unadjusted selling price of the comparable tract.

- Using comparable sale 1: FMV = 4 cents per ton.
- Using comparable sale 2: FMV = 6 cents per ton.

#### 3. Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV either by selecting the clearly superior value or by combining the values using a weighted averaging scheme.

#### II. Adjusted Comparable

The FMV of the Federal tract is set equal to the adjusted selling price of the comparable tract.

#### 1. Using comparable sale 1:

- Estimate the value of the comparable tract using a DCF analysis. The calculated value is (see Data Summary above):

$$\overline{NPV}_{comp} = 6 \text{ cents per ton}$$

- Estimate the value of the Federal tract using a DCF analysis. In this example, the Federal tract can be joined to either of two contiguous tracts to yield two possible MU configurations. The NPV of each configuration is computed and the NPV of the Federal tract is set equal to the larger of the calculated NPVs.

- Calculate the NPV of MU 1.

$$\overline{NPV}_{mu1} = 7 \text{ cents per ton}$$

- Calculate the NPV of MU 2.

$$\overline{NPV}_{mu2} = 9 \text{ cents per ton}$$

- Set the NPV of the Federal tract equal to the higher NPV.

$$\overline{NPV}_{fed} = 9 \text{ cents per ton}$$

### Exhibit 3.8 (Continued)

- c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$D = \frac{NPV_{fed}}{NPV_{comp}}$$

$$D = 9 \div 6$$

$$D = 1.5 \text{ cents per ton}$$

or

2. Proportional adjustment factor

$$R = \frac{NPV_{fed}}{NPV_{comp}}$$

$$R = 9 \div 6$$

$$R = 1.5$$

- d. Estimate FMV.

1. Arithmetic adjustment (preferred)

$$FMV = \text{comparable tract selling price (per ton)} + D$$

$$FMV = 4 + 3$$

$$FMV = 7 \text{ cents per ton}$$

or

2. Proportional adjustment

$$FMV = \text{comparable tract selling price (per ton)} \times R$$

$$FMV = 4 \times 1.5$$

$$FMV = 6 \text{ cents per ton}$$

2. Using comparable sale 2:

- a. The calculated value of the comparable tract is:

$$\frac{NPV_{comp}}{NPV_{comp}} = 10 \text{ cents per ton}$$

Note that this calculation is the NPV (per ton) for the entire MU. The value of the comparable is assumed equal to the value (per ton) of the entire MU.

- b. The calculated value of the Federal tract is set equal to the larger NPV calculated for each MU configuration:

$$\frac{NPV_{fed}}{NPV_{fed}} = 9 \text{ cents per ton}$$

- c. The adjustment factor is:

1. Arithmetic adjustment factor (preferred)

$$D = \frac{NPV_{fed}}{NPV_{comp}}$$

$$D = 9 \div 10$$

$$D = 0.9 \text{ cents per ton}$$

or

2. Proportional adjustment factor

$$R = \frac{NPV_{fed}}{NPV_{comp}}$$

$$R = 9 \div 10$$

$$R = 0.9$$

- d. The estimate of FMV of the Federal tract is:

1. Arithmetic adjustment (preferred)

$$FMV = \text{comparable tract selling price (per ton)} + D$$

$$FMV = 6 + (-1)$$

$$FMV = 5 \text{ cents per ton}$$

or

2. Proportional adjustment

$$FMV = \text{comparable tract selling price (per ton)} \times R$$

$$FMV = 6 \times 0.9$$

$$FMV = 5.4 \text{ cents per ton}$$

3. Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV.

### III. Income Approach

The income approach is used to estimate value when comparable sales data are unavailable. The procedure is identical to the method described above to calculate the NPV of the Federal tract. Recall that, in this example, two NPV estimates are calculated, each corresponding to the Federal tract in a different MU configuration. The FMV of the Federal tract is set equal to the larger NPV.

$$FMV = \frac{NPV_{fed}}{NPV_{fed}} = 9 \text{ cents per ton}$$



## 2. Sale of other type tracts.

- a. Sale of a tract that is an entire MU for a new mine operation (Type 1 tract).
- b. Sale of a portion of an MU for a new mine operation (Type 2 tract).

The use of a Type 1 or a Type 2 tract to estimate value of a Type 3 tract is less reliable than the use of a prior sale of a Type 3 tract because it requires much greater reliance on the adjustment procedure.

### 3.4.3.1 Unadjusted Comparable Sales

Use the unadjusted value of a comparable sale to estimate the value of a Type 3 tract when it can be shown that the attributes of the comparable tract are sufficiently similar to the attributes of the Federal tract that an adjustment to the comparable sale price to account for differences does not provide a better estimate of value. If an unadjusted comparable is used, set the FMV of the Federal tract equal to the selling price (per ton) of the comparable tract:

FMV = selling price per ton of comparable tract.

### 3.4.3.2 Adjusted Comparable Sales

Use the DCF-adjusted value of a comparable sale to estimate the value of a Type 3 tract when it is necessary to account for differences in tract attributes. If a DCF-adjusted comparable is used, set the FMV of the Federal tract equal to the adjusted selling price (per ton) of the comparable tract. The adjusted selling price represents the incremental value of the Federal tract to the existing mine operation. It is estimated as follows:

1. Estimate the NPV of the comparable tract.

- a. The comparable tract is an increment to an existing mine (Type 3 tract).

The **incremental** NPV of the comparable tract is estimated using a DCF analysis. First, estimate the NPV ( $NPV_{old}$ ) of the existing mine operation adjacent to the comparable tract. The NPV is determined from the annual cash flow that would have occurred without the addition of the comparable tract. Next estimate the NPV ( $NPV_{new}$ ) of the **combined** existing mine and comparable tract. Then calculate the incremental value (per ton) of the comparable tract as follows:

$$\overline{NPV}_{comp} = (\overline{NPV}_{new} - \overline{NPV}_{old}) / \text{comparable tract tons.}$$

- b. The comparable tract is a Type 1 or a Type 2 tract.

The **average** NPV of the comparable tract is estimated using a DCF analysis. Estimate the NPV of the MU that includes the comparable tract. (Note: the MU and the comparable tract may be identical or the MU may contain the comparable tract. See Section 3.4.2.) Calculate the value (per ton) of the comparable as follows:

$$\overline{NPV}_{comp} = \overline{NPV}_{mu} / \text{MU tons.}$$

2. Estimate the incremental NPV of the Federal tract. The incremental NPV of the Federal tract is estimated using a DCF analysis. First, estimate the NPV ( $NPV_{old}$ ) of the existing mine operation adjacent to the Federal tract. Next estimate the NPV ( $NPV_{new}$ ) of the combined existing mine operation and Federal tract. Then calculate the incremental value (per ton) of the Federal tract as follows:

$$\overline{\text{NPV}}_{\text{fed}} = (\text{NPV}_{\text{new}} - \text{NPV}_{\text{old}}) / \text{Federal tract tons.}$$

3. Determine the adjustment to the comparable sale price.

The adjustment may be either arithmetic or proportional. The adjustment to the comparable sale price is calculated as follows:

a. Arithmetic adjustment factor:

$$D = \overline{\text{NPV}}_{\text{fed}} - \overline{\text{NPV}}_{\text{comp}}$$

b. Proportional adjustment factor:

$$R = \overline{\text{NPV}}_{\text{fed}} / \overline{\text{NPV}}_{\text{comp}}$$

4. Estimate FMV. Set the FMV of the Federal tract equal to the adjusted comparable tract selling price.

a. Arithmetic adjustment:

$$\text{FMV} = \text{comparable tract selling price (per ton)} + D.$$

b. Proportional adjustment:

$$\text{FMV} = \text{comparable tract selling price (per ton)} \times R.$$

### 3.4.3.3 Income approach

Use the income approach to value a Type 3 tract when comparable sales are unavailable. The incremental value of the Federal tract is estimated as follows:

1. Develop mine plans.

a. Current mine operation. Develop a mine plan for the current mine operation using the actual production rate and development schedule.

- b. Combined mine operation. Develop a mine plan for the combined mine operation (existing mine operation plus Federal tract) using actual and projected production rate and development schedule.
2. Develop cost data. Estimate capital cost, annual operating cost, and revenues for each mine plan using current prices for original and replacement equipment, labor rates, and additional capital investment. Use the coal contract price, if available, to estimate revenues.
3. Develop annual cash flow. Annual cash flow is determined from revenue, capital and operating costs, and taxes. The annual cash flow for each mine plan is developed for the period that includes the initial existing mine start-up (negative years) to the end of mine life (positive years).
4. Estimate FMV of the Federal tract. Estimate the NPV of the current mine operation ( $NPV_{\text{current}}$ ) and the NPV of the combined mine operation ( $NPV_{\text{combined}}$ ) using a DCF analysis. Calculate the incremental value (per ton) of the Federal tract as follows:

$$\overline{NPV}_{\text{fed}} = (NPV_{\text{combined}} - NPV_{\text{current}}) / \text{Federal tract tons}$$

Set the FMV of the Federal tract equal to the incremental value.

$$FMV = \overline{NPV}_{\text{fed}}$$

In some estimations, the Federal tract may be combined with more than one existing mine operation. Select the combined operation that results in the largest incremental value. Then set  $\overline{NPV}_{\text{fed}}$  equal to that value and estimate FMV as described above.

An example of the valuation of a Type 3 tract is illustrated in Exhibit 3.9.

#### 3.4.4 Special Considerations

The procedures discussed above are not meant to constrain the RET to applying specific appraisal methods when their application would be inappropriate. The RET has the flexibility to apply alternative methods to obtain an estimate of value if sufficient information is unavailable to credibly apply the procedures or the situation requiring valuation does not readily adapt to the methods described. In these special cases, the RET may use whatever information is available to develop an estimate of value. The estimate of value must be derived in a reasoned manner. For example, a situation may arise where it is necessary to value a small coal tract for a short-term emergency lease and it is known that mining the tract would be unprofitable. In this case, it might be inappropriate to model the tract or to use DCF-based analyses to estimate value. An alternative approach would be to develop an estimate of value based on the information known about the mine operation requiring the emergency lease. This approach is acceptable, provided the value estimate is not arbitrary and it can be shown to be derived in a reasoned manner.

### Exhibit 3.9

Tract Type 3: The offered Federal tract constitutes an increment to an existing mine operation.

#### Offered Federal Tract

Federal Tract 20 MM Tons	Existing Mine 1	120 MM Tons Total
Existing Mine 2		
100 MM Tons Total		

The offered Federal tract is an increment to an existing mine operation. In this example, the offered tract containing 20 million tons may be combined with an adjoining existing mine operation containing 100 million tons or an adjoining existing mine operation containing 80 million tons.

#### Comparable Tracts

##### o Comparable Tract 1

15 MM Tons	120 MM Tons Existing Mine Operation	135 MM Tons Total
Selling Price = 30 per ton		

The comparable tract is a prior sale of a 15 million ton increment to an existing mine operation.

##### o Comparable Tract 2

200 MM Tons
Selling Price = 26 per Ton

The comparable sale is a prior sale of an entire mining unit for a new mine operation (Type 1 tract).

#### Data Summary

Tract	Tons in Tract (in millions)	Selling Price	Calculated Total NPV	Calculated NPV per ton
Offered Federal Tract	20	---	---	---
Federal tract plus Mine 1	120	---	\$31.5 million	26.3 cents per ton
Mine 1	100	---	\$30.0 million	30.0 cents per ton
Federal tract plus Mine 2	100	---	\$31.7 million	31.7 cents per ton
Mine 2	80	---	\$29.6 million	37.0 cents per ton
Comparable Tract 1	15	3 cents per ton	---	---
Comparable Tract plus existing mine	135	---	\$37.8 million	28.0 cents per ton
Existing mine	120	---	\$36.0 million	30.0 cents per ton
Comparable Tract 2	200	2 cents per ton	---	9.0 cents per ton

The three methods for valuing a Type 3 tract are as follows:

#### I. Unadjusted Comparable

The FMV of the Federal tract is set equal to the unadjusted selling price of the comparable tract.

- Using comparable sale 1: FMV = 3 cents per ton.
- Using comparable sale 2: FMV = 2 cents per ton.
- Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV either by selecting the clearly superior value or by combining the values using a weighted averaging scheme.

#### II. Adjusted Comparable

The FMV of the Federal tract is set equal to the adjusted selling price of the comparable tract.

- Using comparable sale 1 (comparable tract is an increment to existing mine operation):

a. Calculate the incremental value of the comparable tract, as follows:

- Calculate the NPV of the existing mine operation adjacent to the comparable tract (see Data Summary above).

$$NPV_{old} = \$36.0 \text{ million}$$

- Calculate the NPV of the combined comparable tract and existing mine operation.

$$NPV_{new} = \$37.8 \text{ million}$$

- Calculate the incremental value of the comparable tract.

$$NPV_{comp} = NPV_{new} - NPV_{old}$$

$$NPV_{comp} = \$37.8 - \$36.0$$

$$NPV_{comp} = \$1.8 \text{ million}$$

### Exhibit 3.9 (Continued)

4. Convert the incremental value to a per ton basis.

$$\overline{NPV}_{comp} = NPV_{comp} + \text{comparable tract tons}$$

$$\overline{NPV}_{comp} = \$1.8 \text{ million} + 15 \text{ million tons}$$

$$\overline{NPV}_{comp} = 12 \text{ cents per ton}$$

- b. Calculate the incremental value of the Federal tract, as follows (Note: In this example, the Federal tract may be combined with existing mine operations in either of two configurations. To determine the incremental value it is necessary to compute the value of the Federal tract in each configuration. The incremental value is selected from the configuration that yields the higher value):

1. Calculate the incremental value of the Federal tract joined with mine 1, as follows:

- a. Calculate the NPV of mine 1.

$$NPV_{old} = \$30.0 \text{ million}$$

- b. Calculate the NPV of the Federal tract combined with mine 1.

$$NPV_{new} = \$31.5 \text{ million}$$

- c. Calculate the incremental value of the Federal tract to mine 1.

$$NPV_{fed} = NPV_{new} - NPV_{old}$$

$$NPV_{fed} = 31.5 - 30.0$$

$$NPV_{fed} = \$1.5 \text{ million}$$

2. Repeat the calculation for the Federal tract joined with mine 2.

- a. Calculate the NPV of mine 2.

$$NPV_{old} = \$29.6 \text{ million}$$

- b. Calculate the NPV of the Federal tract combined with mine 2.

$$NPV_{new} = \$31.7 \text{ million}$$

- c. Calculate the incremental value of the Federal tract to mine 2.

$$NPV_{fed} = NPV_{new} - NPV_{old}$$

$$NPV_{fed} = 31.7 - 29.6$$

$$NPV_{fed} = \$2.1 \text{ million}$$

3. Select the higher incremental NPV and convert to a per ton basis.

$$\overline{NPV}_{fed} = (NPV_{fed})_{max} + \text{Federal tract ton}$$

$$\overline{NPV}_{fed} = \$2.1 \text{ million} + 20 \text{ million tons}$$

$$\overline{NPV}_{fed} = 10.5 \text{ cents per ton}$$

- c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$D = NPV_{fed} - NPV_{comp}$$

$$D = 10.5 - 12.0$$

$$D = -1.5 \text{ cents per ton}$$

or

2. Proportional adjustment factor

$$R = NPV_{fed} \div NPV_{comp}$$

$$R = 10.5 \div 12.0$$

$$R = 0.875$$

- d. Estimate FMV.

1. Arithmetic adjustment (preferred)

$$FMV = \text{selling price (per ton) of comparable tract} + D$$

$$FMV = 3 + (-1.5)$$

$$FMV = 1.5 \text{ cents per ton}$$

or

2. Proportional adjustment

$$FMV = \text{selling price (per ton) of comparable tract} \times R$$

$$FMV = 3 \times 0.875$$

$$FMV = 2.625 \text{ cents per ton}$$

2. Using comparable sale 2 (Type 1 tract):

- a. Calculate the average value of the Type 1 comparable tract using a DCF analysis. (Note that an incremental value is not calculated for a Type 1 tract, even though the tract may only be a portion of an MU for a new mine operation.)

$$\text{The calculated average value is: } \overline{NPV}_{comp} = 9 \text{ cents per ton.}$$

- b. Calculate the incremental value of the Federal tract, as described above. The calculated incremental value is:  $\overline{NPV}_{fed} = 10.5 \text{ cents per ton.}$

### Exhibit 3.9 (Continued)

- c. Determine the adjustment to the comparable sale price.

1. Arithmetic adjustment factor (preferred)

$$\begin{aligned}D &= \frac{NPV_{fed}}{NPV_{comp}} \\D &= 10.5 \div 9 \\D &= 1.5 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment factor

$$\begin{aligned}R &= \frac{NPV_{fed}}{NPV_{comp}} \\R &= 10.5 \div 9.0 \\R &= 1.167\end{aligned}$$

- d. Estimate FMV.

1. Arithmetic adjustment (preferred)

$$\begin{aligned}FMV &= \text{selling price (per ton) of comparable tract} + D \\FMV &= 2 + 1.5 \\FMV &= 3.5 \text{ cents per ton}\end{aligned}$$

or

2. Proportional adjustment

$$\begin{aligned}FMV &= \text{selling price (per ton) of comparable tract} \times R \\FMV &= 2 \times 1.167 \\FMV &= 2.33 \text{ cents per ton}\end{aligned}$$

3. Reconciliation of multiple values:

The multiple estimates of value must be reconciled into a single estimate of FMV.

### III. Income Approach

The income approach is used to estimate value when comparable sales data are unavailable. The procedure is identical to the method described above to calculate the incremental value (per ton) of the Federal tract. Recall that, in this example, two incremental values are calculated, each corresponding to the Federal tract combined with different existing mine operations. The incremental value for each configuration is calculated, and the FMV of the Federal tract is set equal to the larger incremental value.

$$FMV = \frac{NPV}{\text{fed}} = 10.5 \text{ cents per ton}$$



#### 4. PREPARATION OF PRESALE APPRAISAL REPORT

##### 4.1 FORMAT

Appraisal reports prepared for the BLM should follow the general reporting standards described in the Uniform Appraisal Standards for Federal Land Acquisitions and The Appraisal of Real Estate (1983). The appraisal report should be prepared in a narrative format and should use clear, concise language to ensure that the report is understandable to readers. Appraisals must be based on accurate data and logical reasoning. Estimates of value cannot be based on unsupported opinions or personal belief. The report should contain sufficient data and supportable analysis to justify the estimate of FMV.

##### 4.2 APPRAISAL REPORT STRUCTURE

Each appraisal report should contain introductory material, factual data, analysis and conclusions, and exhibits and addenda, following the outline presented below.

###### 4.2.1 SUMMARY PAGE

The first page of the appraisal report summarizes the appraisal information and conclusions. It contains only brief descriptions of the information presented. The information included on the summary page is as follows:

-- **Purpose of Appraisal.** Briefly describe the purpose of the appraisal and include the effective date of the estimate. The description should be a one-line statement.

-- **Legal Description of Tract(s).** Tabulate the legal description of the tract(s) being appraised in terms of:

- o Township.
- o Range.
- o Meridian.

- o Section.
- o Subdivision.
- o Acreage.

-- **Appraisal Summary.** List the estimated FMV for the tract(s). The appraised value(s) should be presented in cents/ton, dollars/acre, and total value.

-- **Appraisal Method.** State the method of appraisal.

-- **Signature.** The chief of the RET will sign and date the summary page.

#### **4.2.2 Table of Contents**

A table of contents is recommended for long reports.

#### **4.2.3 Introduction**

The introduction provides an introductory overview of the appraisal. It addresses the purpose of the appraisal and discusses the general assumptions, directions, and guidance for the appraisal.

#### **4.2.4 Appraisal Tract Description**

##### **4.2.4.1 Legal Description**

This section provides a complete legal description of the tract(s) being appraised. If the description is lengthy, include it as an appendix and refer to it in the text. At a minimum, include the items listed below. Document all sources of data such as:

- o Tract identification or name.
- o Township.
- o Range.
- o Meridian.
- o Section.
- o Subdivision.
- o Total acreage and the acreage used to estimate FMV (if it differs).

#### **4.2.4.2 Appraisal Tract Data**

Discuss all pertinent information about the appraised tract(s). At a minimum, include the items listed below. Document all sources of data.

- o Location in region.
- o Proximity to transportation and coal markets.
- o Type of tracts (e.g., new production, captive).
- o Coal reserves (e.g., geological description, seams, resource base, reserves).
- o Coal quality (i.e., Btu/lb, % moisture, % ash, % sulfur, % volatile matter, % fixed carbon).
- o Supporting documentation (e.g., maps).
- o Other important qualities, when applicable (e.g., high sodium).

#### **4.2.5 Analysis**

The analysis section discusses the procedure for determining the value of the Federal coal property/right.

##### **4.2.5.1 Appraisal Method**

An overview of the mineral property appraisal technique is presented. The overview includes a discussion of appraisal approaches and appraisal criteria. The methods of obtaining data, appraisal approaches, and the reconciliation method are briefly discussed. The type and quality of available data determine the appraisal method used. Both the reasons for selecting the method and the reasons for rejecting alternative approaches are discussed.

#### 4.2.5.2 Value Estimated by the Comparable Sales Approach

All comparable sales transactions used must be confirmed by persons having knowledge of the price, terms, and conditions of the sale. Discuss each comparable in relation to the tract being appraised.

-- **General Considerations.** Several general considerations should be included in the appraisal process:

- o All data considered in the valuation process should be discussed (e.g., comparable sale transactions that may not have been included in the valuation). Support must be provided for including or excluding sales from the appraisal process.
- o All sales investigated (including sales subsequently rejected) having a reasonable degree of comparability are included. Each sale is included for direct, detailed comparison.
- o Comparable sales should be identified clearly and consistently to permit cross reference with comments made in the appraisal report.
- o Support must be developed for an adjustment made in the valuation process. The characteristics that lead to an adjustment are to be established.
- o Comparisons are made on a sale basis, rather than a characteristic basis. Discuss each sale fully and consider all differences before proceeding to the next sale. Complete the discussion of each sale by considering the characteristics leading to the adjustment and

conclude with an overall comparison with the tract being appraised.

- **Data Acquisition.** Efforts to acquire data and the sources from which raw data were obtained should be discussed. Include a discussion of how the data are selected and verified.
- **Data Presentation.** Data documentation must be presented in a manner that would allow the reader to duplicate the data acquisition. Documentation of the data used for direct comparison must be included as a narrative comparison and a comparison summary chart. Identify the data type and essential facts relating to the comparative property that document qualitative and quantitative differences between it and the offered tract. All records and supporting data and documentation must be maintained in auditable files at the BLM field offices. The files will contain all documentation pertaining to the appraisal and supporting its conclusions. The files may also include maps, transaction documentation, telephone conversations, memos, and any other pertinent information.
- **Data Analysis.** Fair market value is estimated by the comparable sales approach using unadjusted comparable transactions, adjusted comparable transactions, or regression analysis (regression analysis may not be feasible because of insufficient data). Discuss the considerations that resulted in the selection of a specific valuation procedure. If an unadjusted comparable transaction is used, develop support for basing value on an unadjusted selling price. If an adjusted comparable transaction is used, present the data that supports the need for an adjustment.

o **Comparison Factors.** Various mineral property characteristics are recognized by the market as influencing value. These factors should be identified, discussed, and analyzed to develop support for a comparable sale price adjustment. Characteristics to be considered include:

- a. Date of sale.
- b. Sale price.
- c. Market conditions.
- d. Total lease acres.
- e. Total coal acres.
- f. Average coal thickness.
- g. Average overburden thickness.
- h. Average stripping ratio.
- i. Recoverable coal resource estimate.
- j. Coal quality.
- k. Transportation and marketing.
- l. Lease terms.
- m. Other factors.

o **Adjustment.** An adjusted transaction accounts for differences in the characteristics between the comparable property and the offered tract. Discuss the differences in tract characteristics that require adjustment. Show how these differences are incorporated into the estimation process through the DCF method. Include a discussion of the arithmetic or proportional adjustment procedure.

-- **Reconciliation of Comparable Values.** Multiple estimates of value are reconciled into a single indication of value. Discuss the reconciliation method and the rationale for estimating weights (if used).

#### 4.2.5.3 Value Estimated by Income Approach

Adequate factual data to support the appraisal analysis should be included. The capitalization method used must be explained in narrative form and supported by a statement of sources and factors.

- **Data Acquisition, Selection, and Documentation.** The efforts to acquire data and the sources from which the data were obtained should be described. Include a discussion of how the data are collected and verified. Discuss the rationale for selecting specific data elements. The data acquisition should be documented in such a manner that data acquisition may be duplicated. All records and supporting documentation should be maintained in auditable files at the BLM field offices. The files should contain all documentation pertaining to the appraisal and supporting its conclusions. The files may include maps, names, telephone conversations, and any other pertinent information.
- **Mine Plan.** The development of the mine plan should be described and supported. Refer to the tract characteristics and regional mining methods to support the mine type, equipment selection, manpower requirements, and other pertinent factors.
- **Revenues.** The coal prices and production schedule used in the analysis must be described and supported.
- **Estimated Production Costs.** The method for developing mine production costs must be described and supported. Include an explanation of the model(s) used (if any) and its input requirements.
- **Capitalization Technique.** The DCF method used should be discussed. Indicate the input requirements and discuss how they were developed for the analysis. If

a probabilistic method is used, discuss how probability weights, scenarios, or Monte Carlo inputs (distributions and variances) were developed.

- **Summary and Indication.** A summary of the basic steps and the final market value indication from the income approach should be included following the income approach narrative.

#### **4.2.6 Exhibits or Addenda**

All exhibits needed in the mineral property valuation process, in addition to those used in the body of the report, should be included. Detailed data and information pertaining to the property or other important valuation factors that are too lengthy for the body of the report or that distract from a coherent presentation should be placed in this section.

#### **4.3 SIGNATURE**

The chief of the RET will sign and date the appraisal report. The report will be submitted to the designated Deputy State Director for his review and signature.

#### **4.4 CONFIDENTIALITY OF DATA**

The presale estimate of FMV plus any proprietary data used in the estimation of FMV must be properly safeguarded. Only those persons with a "need to know" shall have access to the sensitive data.

- The data shall not be discussed outside of the official BLM meetings and shall not be discussed over the phone.
- Meetings where the data are discussed shall be held in a secure office and in such a manner that non-BLM personnel and BLM personnel without a need to know are prohibited from having access to confidential data.



- All confidential data shall be locked in a secure government approved filing cabinet or vault when the data are not actually required for analysis and discussion purposes.
- All draft and final typed reports relating to FMV presale estimates shall be treated as confidential information.



## 5. POST-APPRAISAL PROCESS

### 5.1 INTRODUCTION

The post-appraisal process includes appraisal-related activities that occur after the RET issues a completed appraisal report. These activities include an independent review of the presale appraisal, a post-sale analysis of bids, and a review of the post-sale analysis. Post-appraisal activities are summarized as follows:

- **Review of Presale Appraisal Report.** The presale appraisal report is independently reviewed for technical content and conformance to appraisal guidelines.
- **Post-Sale Analysis of Bids.** Evaluation criteria are applied to bids received for offered tracts. Additional market information may be derived from an analysis of bids. This information may be used in the evaluation of bids for which there was no competition.
- **Review of Post-Sale Analysis.** Recommendation for bid acceptance or rejection is formalized in a post-sale analysis report. The report is reviewed for technical content and conformance to accepted procedures.

### 5.2 REVIEW OF PRESALE APPRAISAL REPORT

The presale appraisal report is submitted to the designated Deputy State Director for an initial review for conformance to appraisal guidelines. The report then is submitted for an independent review. The purpose of the independent review is to ensure that the appraisal is consistent with the appraisal guidelines and the estimation of value is adequately supported. The approved report is signed by the designated Deputy State Director after completion of the independent review and after incorporation of any necessary revisions.

### 5.2.1 Review of Appraisal Procedures

The appraisal is reviewed to ensure that it conforms to accepted appraisal procedures as delineated in A Guide to Federal Coal Property Appraisal. The presale appraisal report should document the alternative approaches considered for the appraisal and the reasons for selecting a specific appraisal method. The reviewer will analyze the arguments presented and make an assessment of their validity. The assessment should consider the following arguments:

- Are input data shown to be selected on a fair and defensible basis?
- Is the appraisal procedure appropriate for the available data?
- Will alternative methods yield a better estimate of value?

In summarizing an opinion of the appraisal method, the reviewer will address:

- Why the appraisal method is or is not appropriate.
- Any precedent for using or not using the appraisal method.

### 5.2.2 Review of Supporting Documentation

The appraisal documentation will be reviewed to ensure that all conclusions are adequately supported. The reviewer will ensure that:

- Each substantive conclusion is supported by data or analysis.
- References to supporting data are adequately documented.
- Material included in the appendices are relevant to the appraisal report and are sufficient to support its conclusions.

The reviewer will document the evaluation of supporting documentation. Insufficient documentation to support conclusions will be highlighted, and the report will be returned to the RET for revision. If applicable, the reviewer will suggest sources of additional information to assist the appraisal process.

### **5.2.3 Documenting the Presale Appraisal Report Review**

The reviewer will attach a written memorandum to the presale appraisal report indicating the scope of his review and supporting the recommended actions.

## **5.3 POST-SALE ANALYSIS OF BIDS**

The Department of the Interior is chartered with accepting or rejecting a bid on a Federal coal lease tract. In evaluating the bids, the sale panel will screen all bids to determine if they qualify for further consideration. To qualify for further consideration, the bid must satisfy all of the following criteria:

- The bid meets or exceeds the minimum bid.
- The bidder passes all the qualification requirements delineated in 43 CFR 3400.
- There is no indication of collusion in the bidding of the coal lease tract(s).

Bids passing the screen are reviewed for recommendation to the authorized officer for acceptance or rejection.

### **5.3.1 Bid Acceptance Process**

Prior to opening, the bids are divided into three categories: tracts with two or more bids, tracts with one bid, and tracts with no bids. Tracts with no bids are of no further consideration in this process. The review of the bids proceeds sequentially as described in the following sections.

#### 5.3.1.1 Tracts With Two or More Bids

At least two countable bids must be received for the tract. A bid must meet or exceed 25 percent of the presale appraisal to be countable. Any bid less than 25 percent of the presale appraisal must be excluded from the count. If two or more bids equal or exceed 25 percent of the presale appraisal, the recommendation for acceptance of the high bid on that tract is decided by the averaging rule. If only one countable bid is received for the tract, the bids are set aside for evaluation with one-bid tracts. If no countable bids are received, the bids also are set aside for evaluation with one-bid tracts.

The recommendation for acceptance of the high bid on a tract with two or more countable bids is decided by the averaging rule. The averaging rule adds the presale appraisal to the sum of the countable bids and divides by the number of countable bids plus one. This average is called the **Average Evaluation of Tract (AEOT)**. A high bid equal to or greater than the AEOT is recommended for acceptance. A high bid less than the AEOT is recommended for rejection.

Tracts whose high bids are recommended for acceptance by the AEOT rule will be examined to isolate those tracts that can be used as post-sale comparables. Tracts used as post-sale comparables must satisfy the **eligible** and **selectable** criteria for comparable tracts. If these criteria are satisfied, the tract is a candidate for use as a post-sale comparable in evaluating remaining tracts.

#### 5.3.1.2 Tracts With Only One Bid

Tracts receiving only one bid and tracts with two or more bids that have fewer than two countable bids are reviewed after the evaluation of the tracts with two or more countable bids has been completed. Tracts from the preceding evaluation accepted as comparables for use in the post-sale analysis should be reviewed to see if they should be incorporated in a revised post-sale appraisal.

Tracts accepted as comparables provide current competitive market data about lease values. Tracts for which only presale comparables and presale appraisals apply are recommended for acceptance if the high bid exceeds the presale appraisal. Tracts for which a reappraisal has been made on the basis of an additional comparable from the sale are recommended for acceptance if the high bid exceeds the reappraised value.

### 5.3.2 Post-Sale Analysis Report

The RET writes a post-sale analysis report, which should contain sufficient detail and supporting analysis and documentation so that the reader can proceed logically from the data to the report's recommendations. If a post-sale comparable was used to reappraise a tract, the criteria for selecting the comparable should be discussed. The report will be reviewed by the designated Deputy State Director for conformance to the guidelines.

### 5.4 REVIEW OF POST-SALE ANALYSIS

The presale appraisal report and the post-sale analysis report are submitted to the sale panel for analysis and recommendation. The sale panel makes its recommendation for acceptance or rejection of a qualified high bid. The sale panel will document its recommendations and submit them to the authorized officer for a decision. The sale panel will review the post-sale analysis report as follows:

- Review the procedures used in developing the presale appraisal and the post-sale analysis that form the basis for accepting or rejecting a bid.
  - o If necessary, submit questions to cognizant individuals to clarify salient features of each analysis.
  - o Identify discrepancies in the analysis that require resolution prior to the decision to accept or reject a bid.

- o Request clarification of discrepancies identified in the review.
- Request revision of the post-sale analysis only if one of the following conditions occur:
  - o A clear technical error that could and should have been detected prior to the sale is identified.
  - o The appraisal standards set forth in the guidelines were not met.
- After resolution of all outstanding issues, the sale panel will prepare a memorandum that documents the results and recommendations of the review of the post-sale analysis.

#### 5.5 CONFIDENTIALITY OF DATA

All post-sale appraisals and reports as well as all presale appraisals and reports, along with other proprietary data, must be treated as confidential and held secure during the post-sale bid evaluation process. When bid acceptance/rejection decisions have been reached by the authorized officer, only the estimated value of tracts accepted shall be made available to the public upon request.



## **6. GLOSSARY**

### **Average Evaluation of Tract (AEOT):**

A tract value based on an averaging of the government's presale estimate with two or more countable bids. A high bid equal to or greater than the AEOT is recommended for acceptance; otherwise, the high bid is rejected.

### **Bonus Bid:**

The dollar amount offered by a potential lessee as consideration for receiving a lease. Under existing regulations, the bonus bid must meet or exceed fair market value to be accepted by the Department of the Interior.

### **Bureau of Land Management (BLM):**

The nation's largest land manager. It administers lands in Federal ownership under multiple-use principles in the public interest. The BLM is responsible for issuing coal leases and conducting land use planning in the Federal coal management program.

### **Coal Tract:**

A defined area that forms a mining unit or a portion of a mining unit (see Tract Type 1, Tract Type 2, and Tract Type 3).

### **Countable Bid:**

A bid satisfying initial screening criteria that meets or exceeds 25 per cent of the government's presale estimate.

### **Designated Deputy State Director:**

The Deputy State Director who reports to the State Director in charge of the RET located in either Santa Fe, New Mexico; Denver, Colorado; or Cheyenne, Wyoming.

### **Emergency Leasing:**

The leasing of Federal coal needed by an existing mine for one of the following reasons: (1) coal is needed within 3 years of the date of the lease application to maintain a mine at its current average annual level

of production or to supply coal for contracts signed before July 19, 1979, or (2) without the emergency lease, Federal coal would be bypassed by mining. An emergency lease can be issued for no more than 8 years of recoverable coal reserves, and to be issued an emergency lease, a mine's need for the coal deposit must result from reasonably unforeseen circumstances.

**Energy Minerals Activity Recommendation System (EMARS):**

The 1975 coal management program made up of three phases: (1) nomination and programming, (2) scheduling, and (3) leasing.

**Exchange:**

A trading of public lands (surface, subsurface, or both) for lands in other ownerships (see **Fee Coal Exchange**, **Fee Mineral Exchange**, and **Fee Title Exchange**).

**Fair Market Value (FMV):**

That amount of cash or the equivalent for which the coal deposit would be sold or leased by a knowledgeable owner willing, but not obligated, to sell or lease to a knowledgeable purchaser who desires, but is not obligated, to buy or lease.

**Federal Coal Leasing Amendments Act of 1976 (FCLAA):**

Law specifying rules to guide the development of coal.

**Federal Lands:**

Lands owned by the United States, without reference to how the lands were acquired or which agency administers the lands, including mineral estate or coal estate underlying private surface, excluding lands held by the United States in trust for Indians, Aleuts, or Eskimos, and lands within the boundaries of Federal Indian Reservations.

**Federal Lands Policy and Management Act (FLPMA):**

Law specifying how the BLM and the DOI are to assure that all Federal resource development decisions in public lands are made in cooperation with State and local government.

**Fee Coal Exchange:**

A fee mineral exchange involving coal.

**Fee Mineral Exchange:**

An exchange that involves subsurface (mineral) rights only.

**Fee Title Exchange:**

An exchange that involves surface and subsurface lands.

**In Situ Coal:**

Coal in its natural or original position.

**Lease:**

Federal coal lease or license to mine issued under the coal leasing provisions of the mineral leasing laws that authorizes the exploration for, or extraction of, coal only under an approved exploration or mining plan.

**Mineral Leasing Act of 1920 (MLA):**

The Federal law that establishes the procedures for the disposal of certain federally owned mineral deposits (including coal) on public domain lands of the United States.

**Mineral Leasing Act For Acquired Lands:**

The Federal law that provides for the disposal of certain federally owned mineral deposits (including coal) on acquired lands of the United States under the procedures of the MLA.

**Minimum Bonus Bid:**

The least amount that must be bid at a Federal coal lease sale, as stated in the notice of sale, to qualify a bid for consideration; the minimum bonus bid is not necessarily fair market value.

**Mining Unit (MU):**

An area of coal land that can be developed and mined in an efficient, economic, and orderly manner with due regard for the conservation of coal reserves and other resources.

**Net Present Value (NPV):**

The value derived by reducing cost and revenue streams to a single number in which future costs and revenues are discounted to the present.

**New Mine Tract:**

A coal tract that contains enough Federal recoverable coal of sufficiently high quality, either by itself or in combination with surrounding nonfederal recoverable coal, to justify spending money and the effort to develop and implement new mining operations.

**Public Land:**

Federal land administered by the BLM.

**Recoverable Coal Reserves:**

The minable coal reserve base excluding all coal that will be left unmined, such as pillars, fenders, and property barriers.

**Regional Evaluation Team (RET):**

A group of professionals that performs economic appraisals on a regional basis under the direction of the Deputy State Director where the team is located.

**Royalty:**

The amount established in a lease that the lessee must pay the lessor as part of the consideration for the right to remove coal for sale or use. Under the FCLAA, royalty is expressed as a percent of the value of the coal. In older leases, royalty was expressed as a fixed amount per ton.

**Sale Panel:**

A group appointed by the BLM state director to review lease sale results and the fair market value analysis and prepare a report recommending acceptance or rejection of bids.

**Tract Type 1:**

A single tract that constitutes a mining unit (MU) for a new mine operation. The tract contains sufficient reserves that can be developed

and mined in an efficient, economic, and orderly manner with due regard for the conservation of coal resources and other resources.

**Tract Type 2:**

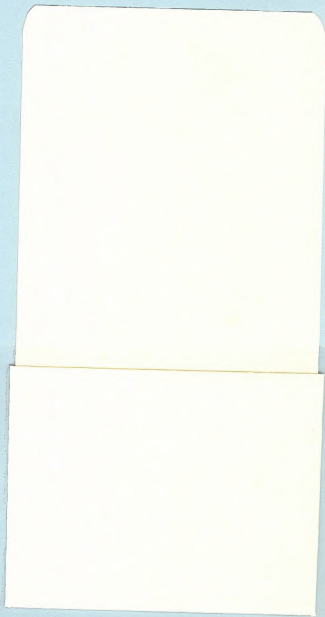
A single tract that constitutes a portion of an MJ for a new mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be used with other contiguous reserves to create an MJ for a new mine operation.

**Tract Type 3:**

A single tract that constitutes an increment to an existing mine operation. The tract does not contain sufficient reserves to independently support a mining operation; however, the reserves can be mined economically in conjunction with an existing mine operation.



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